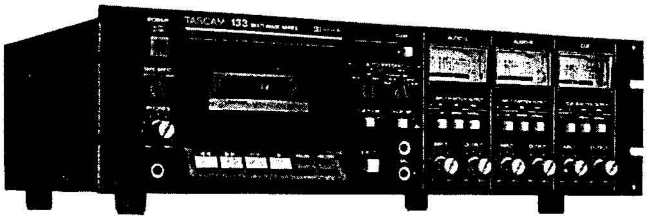
TASCAM
TEAC Production Products



SERVICE MANUAL

133-B

MULTI-IMAGE STEREO PLUS CUE CASSETTE RECORDER-REPRODUCER

Effective: November, 1983. B30226

5704019500

Equalization:		1-7/8 ips (4.76 cm/s) 3180 µs + 70 µs
		3-3/4 ips (9.5 cm/s) 3180 µs + 35 µs
Frequency Response[3]:	**0 VU**	1-7/8 ips (4.76 cm/s) 30 – 8 kHz ±3 dB
(Record/Reproduce)		3-3/4 ips (9.5 cm/s) 30 – 15 kHz ±3 dB
	-20 VU	1-7/8 ips (4.76 cm/s) 30 – 12.5 kHz ±3 dB
		3-3/4 ips (9.5 cm/s) 30 – 15 kHz ±3 dB
Total Harmonic Distortion[3]:		1.5 % at 0 VU, 1 kHz, 160 nWb/m
		1-7/8 ips (4.76 cm/s) 3 % at 5 dB above 0 VU, 1 kHz, 285 nWb/m
		3-3/4 ips (9.5 cm/s) 3 % at 5 dB above 0 VU, 1 kHz, 285 nWb/m
Signal to Noise Ratio[3]:		1-7/8 ips (4.76 cm/s) 55 dB weighted
(At a reference of 3 %		50 dB unweighted
distortion level)		3-3/4 ips (9.5 cm/s) 55 dB weighted
		50 dB unweighted
Adjacent Channel Separation:		Better than 45 dB at 1 kHz
Cross Talk Audio to Cue Track:		Better than 55 dB at 1 kHz
Erasure:		Better than 65 dB at 1 kHz, +10 dB above 0 VU
Headroom		
Recording Amplifier:		Better than +17 dB above 0 VU
Reproduce Amplifier:		Better than +17 dB above 0 VU
(II) Cue Track:		
Line Input		
Input Impedance:		70k ohms, unbalanced
Nominal Input Level:		-10 dBV (0.3 V)
Minimum Input Level:		-20 dBV (0.1 V)
Line Output		
Minimum Load Impedance:		10k ohms
Nominal Load Impedance:		50k ohms
Nominal Output Level:		-7 dBV (0.4 V)/+3 dBV (1.4 V), switchable
Maximum Output Level:		-1 dBV (0.9 V)/+9 dBV (2.8 V), switchable
Standard Recording Level:		200 nWb/m=0 dB*
Equalization:		1-7/8 ips (4.76 cm/s) 3180 µs + 70 µs
		3-3/4 ips (9.5 cm/s) 3180 µs + 35 µs
Frequency Response: [3]	-3 dB*	1-7/8 ips (4.76 cm/s) 30 – 8 kHz ±3 dB
(Record/Reproduce)		3-3/4 ips (9.5 cm/s) 30 – 12.5 kHz ±3 dB
	-23 dB*	1-7/8 ips (4.76 cm/s) 30 – 10 kHz ±3 dB
		3-3/4 ips (9.5 cm/s) 30 – 12.5 kHz ±3 dB
Total Harmonic Distortion: [3]		2.0 % at -3 dB*, 1 kHz, 160 nWb/m
		1-7/8 ips (4.76 cm/s) 3 % at 5 dB above -3 dB*, 1 kHz, 285 nWb/m
		3-3/4 ips (9.5 cm/s) 3 % at 5 dB above -3 dB*, 1 kHz, 285 nWb/m
Signal to Noise Ratio: [3]		1-7/8 ips (4.76 cm/s) 55 dB weighted
(At a reference of 3 %		50 dB unweighted
distortion level)		3-3/4 ips (9.5 cm/s) 55 dB weighted
		50 dB unweighted
Cross Talk Cue to Audio Tracks:		Better than 55 dB at 1 kHz
Cue Tone Generator:		25 Hz, 1 sec.
Erasure:		Better than 65 dB at 1 kHz, +10 dB reference
Headroom		
Recording Amplifier:		Better than +17 dB above -3 dB*
Reproduce Amplifier:		Better than +17 dB above -3 dB*
(III) Power Requirement:		100/120/220/240 V AC, 50/60 Hz, 57 W (General Export Model)
		120 V AC, 60 Hz, 57 W (USA/Candda Model)
		220 V AC, 50 Hz, 57 W (Europe Model)
		240 V AC, 50 Hz, 57 W (UK/AUS Model)

* signifies peak meter values.

In these specifications, 0 dBV is referenced to 1.0 Volt. Actual voltage levels also are given in parenthesis. To calculate the 0 dB = 0.775 Volt reference level (i.e., 0 dBm in a 600-ohm circuit) add 2.2 dB to the listed dB value; i.e., -10 dB re: 1 V = -7.8 dB re:0.775 V.

1) Specifications were determined using TEAC Test Tape MTT-111.

2) Specifications were determined using TEAC Test Tape MXT-111.

3) Specifications were determined using TEAC Test Tape MTT-5061.

Dolby level is referenced to +3 VU.

Changes in specifications and features may be made without notice or obligation.

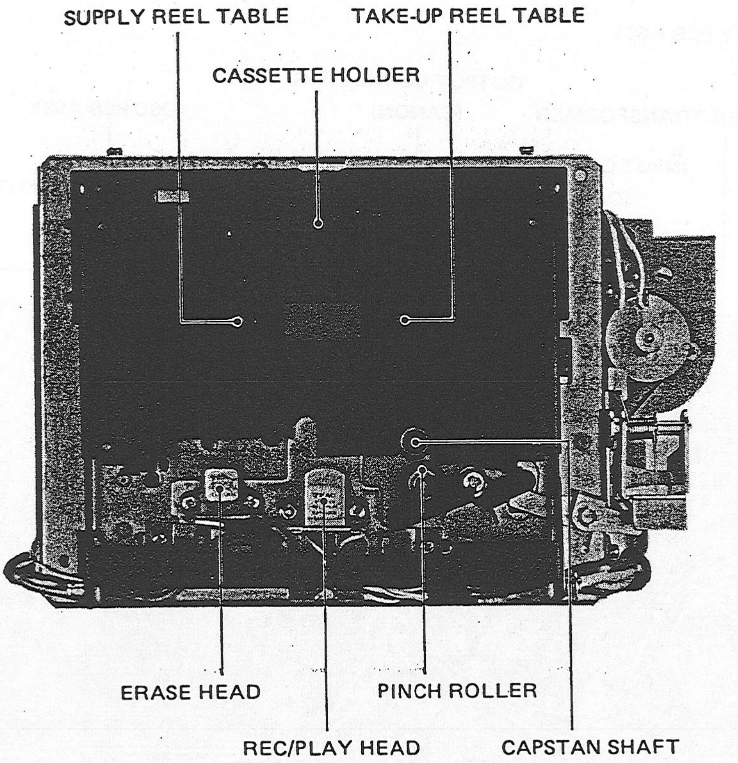

SUPPLY REEL TABLE
TAKE-UP REEL TABLE
CASSETTE HOLDER
ERASE HEAD
PINCH ROLLER
REC/PLAY HEAD
CAPSTAN SHAFT

Fig. 2-2 Transport (Front)

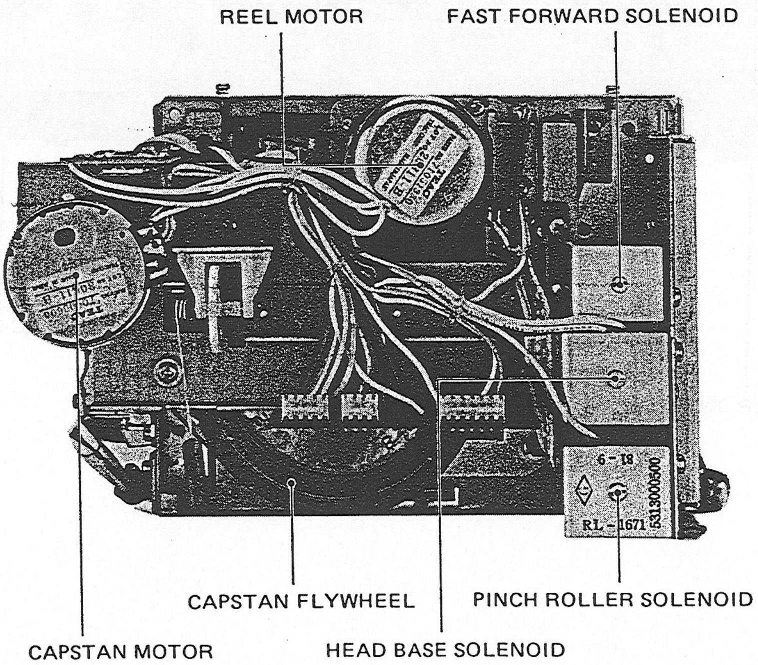

REEL MOTOR
FAST FORWARD SOLENOID
6 - 18
RL - 1671
5313000500
CAPSTAN FLYWHEEL
PINCH ROLLER SOLENOID
CAPSTAN MOTOR
HEAD BASE SOLENOID

Fig. 2-3 Transport (Rear)

2. PARTS LOCATIONS

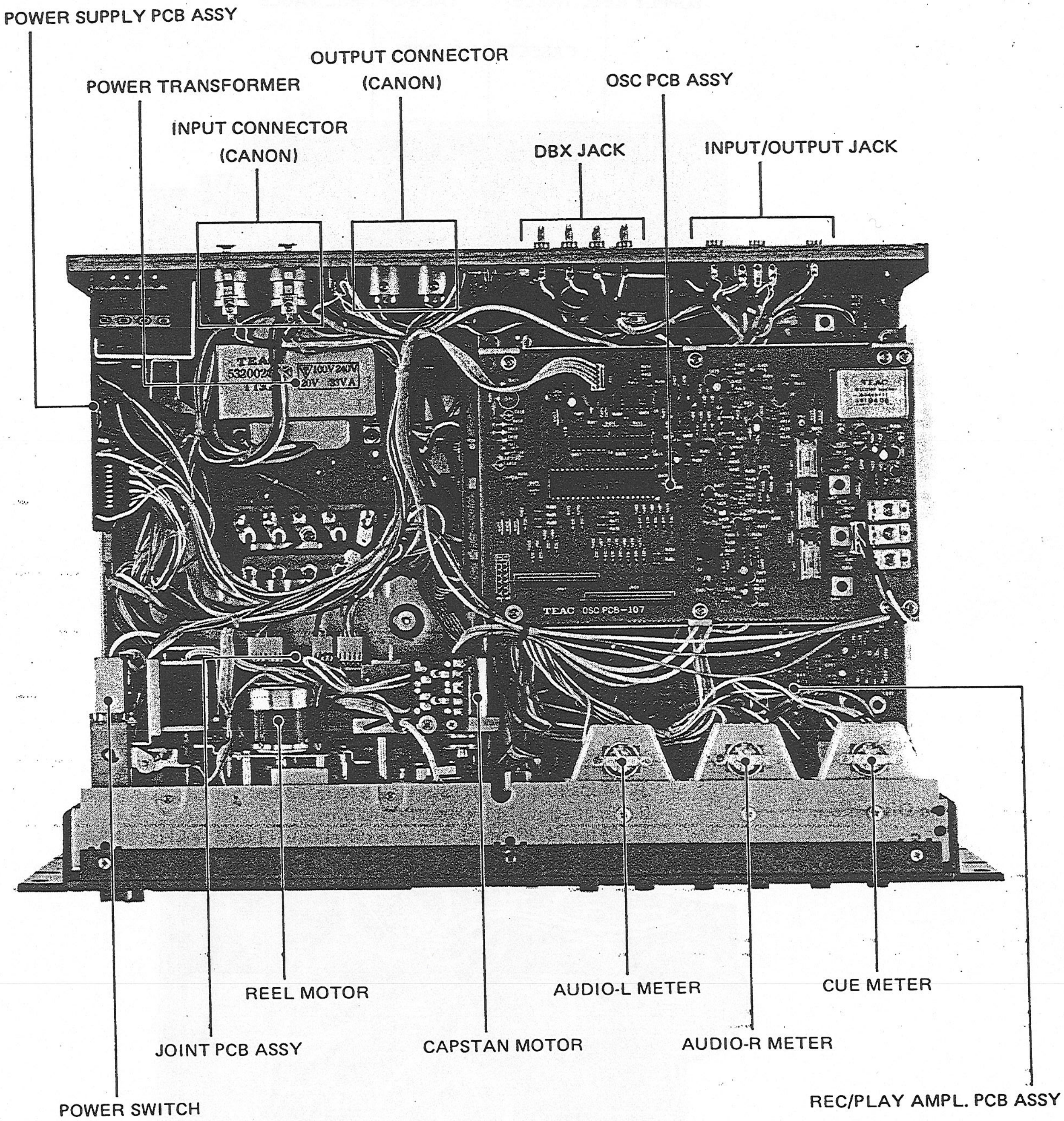
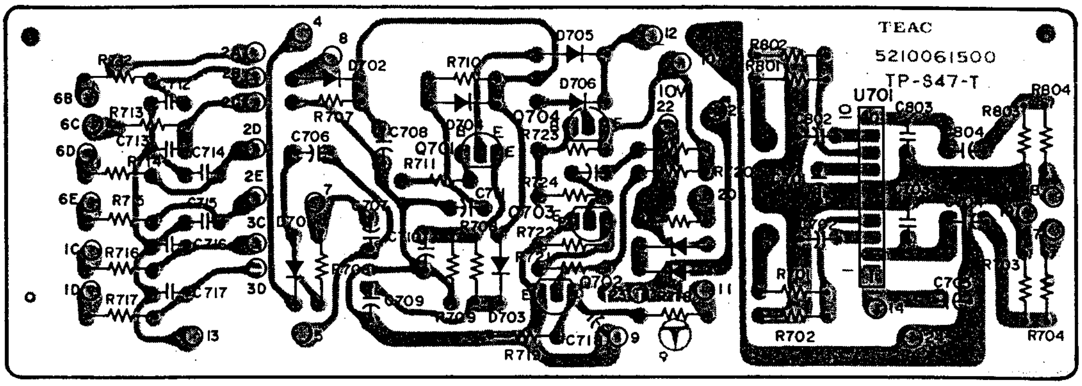
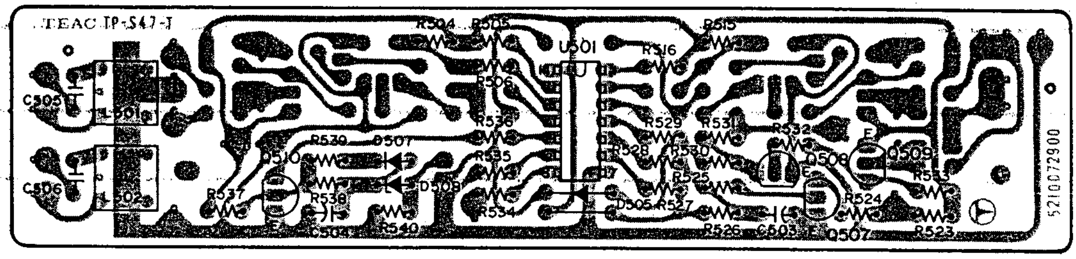

POWER SUPPLY PCB ASSY
OUTPUT CONNECTOR (CANON)
POWER TRANSFORMER
OSC PCB ASSY
INPUT CONNECTOR (CANON)
DBX JACK
INPUT/OUTPUT JACK
TEAC OSC PCB-107
REEL MOTOR
AUDIO-L METER
CUE METER
JOINT PCB ASSY
CAPSTAN MOTOR
AUDIO-R METER
POWER SWITCH
REC/PLAY AMPL. PCB ASSY

Fig. 2-1 Top view

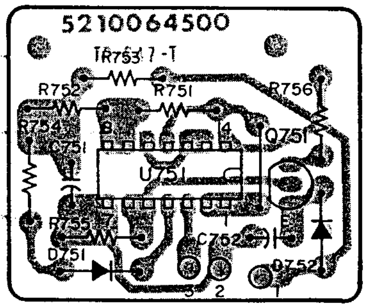
PHONE AMPL. PCB Assy


TEAC
5210061500
TP-S47-T
U701
C803
R802
R801
R804
R803
R702
R701
R703
R704
R710
R707
R711
R712
R713
R714
R715
R716
R717
R709
R723
R724
R722
D702
D703
D705
D706
C706
C708
C709
C712
C713
C714
C715
C716
C717
Q701
Q702
Q703
Q704
6B
6C
6D
6E
1C
1D
2B
2C
2D
2E
3C
3D
4
5
7
8
9
10V
11
12
13
14
22

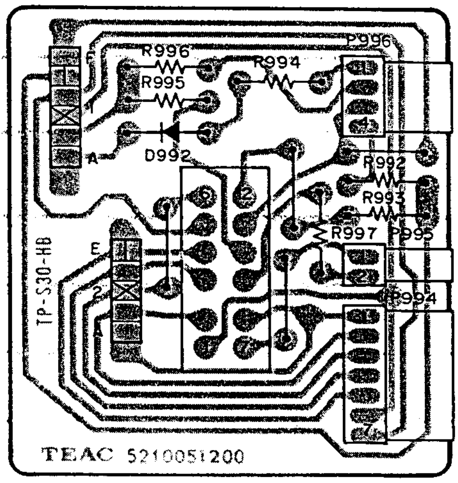
MUTING PCB Assy


TEAC TP-S47-T
5210072900
U501
C505
C506
L501
L502
R504
R505
R506
R515
R516
R523
R524
R525
R526
R527
R528
R529
R530
R531
R532
R533
R534
R535
R536
R537
R538
R539
R540
D505
D507
D508
Q507
Q508
Q509
Q510
C503
C504

CONTROL PCB Assy


5210064500
TP-S47-T
R751
R752
R753
R754
R755
R756
C751
C752
U751
Q751
D751
D752
8
4
1
2
3

REMOTE PCB 111 Assy


R996
R995
R994
R992
R993
R997
D992
P996
P995
P994
TP-S30-HB
TEAC 5210051200
A
E
1
2
6
7

3. CIRCUIT DESCRIPTION

NOTE: In this chapter, the following are assumed.

- *The deck is initially in Stop mode unless otherwise specified.
- *Voltages, waveforms, and operating times, etc. are given simply for reference in the text.

CONTROL SECTION

3-1. SYSTEM CONTROL OUTLINED

The TASCAM 133B system is extensively controlled by an LSI controller (microprocessor). Control operations are outlined below.

The operating keys such as REC and PLAY have their output lines connected to lines D0 to D7 of an 8-bit input port of a digital multiplexer. When one depresses an operating key, an H-level signal comes into the line of the input port to which the key is connected. On the other hand, the controller has a program which controls operating modes and provides a 3-bit address code indicating the associated operating mode through its output ports (C0, C1, and C2) to the input ports (S0, S1, and S2) of the multiplexer. The multiplexer ANDs the operating code with the address code and, if the command of the operating key is the same as that indentified by the address, the multiplexer develops L-level signal through its output port (OUT). This signal, after inverted to H-level, is applied to port A3 of the controller. Now the controller knows that the control command has been given and generates signals required for executing the control command according to the program stored, in the proper sequence and timing.

The deck has another digital multiplexer. This works to resume playback at the end of rewinding to the beginning of tape or to a location whose counter reading has been preset; to maintain Stop mode; or to rewind tape which is at a halt by CUE STOP operation. In operation, this multiplexer simply controls such operations of tape as rewinding, stopping, and playing on the proper timing, and each operation is basically the same as of the multiplexer described first. Detailed description will be given later.

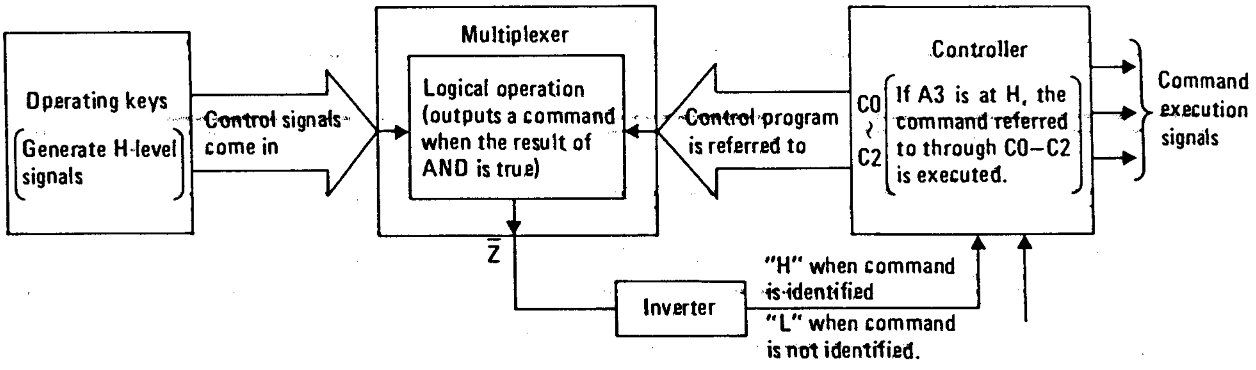

Operating keys
Generate H-level signals
Control signals come in
Multiplexer
Logical operation (outputs a command when the result of AND is true)
Z̄
Inverter
Control program is referred to
Controller
C0 ~ C2
If A3 is at H, the command referred to through C0–C2 is executed.
Command execution signals
"H" when command is identified
"L" when command is not identified.

Fig. 3-1. System control outlined

3-2. MULTIPLEXER OF OPERATING KEY SIGNALS

The pin assignments, logic diagram, and truth table of multiplexer IC U912 (SN74LS151) are given below.

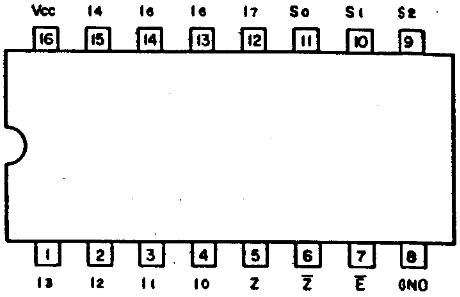
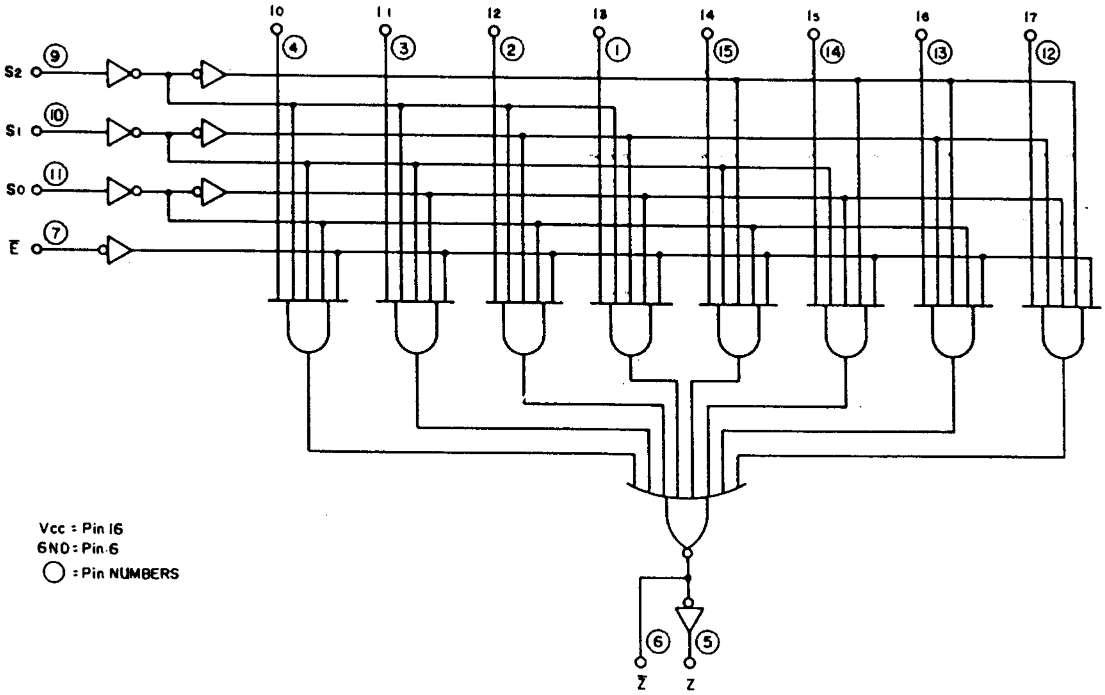

Vcc
I4
I6
I6
I7
So
S1
S2
16
15
14
13
12
11
10
9
1
2
3
4
5
6
7
8
I3
I2
I1
I0
Z
$\bar{Z}$
$\bar{E}$
GND

Fig. 3-2. Pin arrangement of IC U912

	Pin No.	Symbol	Function	Description
Operating command inputs	1	I_3	FF	Input of fast-forward command
	2	I_2	REC	Input of record command
	3	I_1	REW	Input of rewind command
	4	I_0	STDP	Input of stop command
Control command outputs	5	Z	Dutput	(Unused)
	6	$\bar{Z}$	Inverted output	Operating command input will be executed when this is L.
	7	$\bar{E}$	Enable	(Active low input) 0.6 V
	8	GND	Ground	0.6 V
Program code inputs	0	S_2	Code input	3-bit program address code coming from controller
	10	S_1	Codc input	3-bit program address code coming from controller
	11	S_0	Code input	3-bit program address code coming from controller
Operation command inputs	12	I_7	REC SAFETY	H enable recording and L disables.
	13	I_6	(Unused)	(Ground via a resistor)
	14	I_5	PAUSE	Input of pause command
	15	I_4	PLAY	Input of play command
	16	Vcc	PDWER	T B, MAX. 5.2 V, MIN. 4.75 V

Table 3-1. Pin assignments


I0
④
I1
③
I2
②
I3
①
I4
⑮
I5
⑭
I6
⑬
I7
⑫
S2
⑨
S1
⑩
So
⑪
$\bar{E}$
⑦
⑥
⑤
$\bar{Z}$
Z

Vcc : Pin 16
GND : Pin 6
○ : Pin NUMBERS

Fig. 3-3. Logic diagram

Operating mode	$\bar{E}$	S_2	S_1	S_0	I_0	I_1	I_2	I_3	I_4	I_5	I_6	I_7	$\bar{Z}$	Z
–	H	X	X	X	X	X	X	X	X	X	X	X	H	L
STOP	L	L	L	L	L	X	X	X	X	X	X	X	H	L
	L	L	L	L	H	X	X	X	X	X	X	X	L	H
REW	L	L	L	H	X	L	X	X	X	X	X	X	H	L
	L	L	L	H	X	H	X	X	X	X	X	X	L	H
REC	L	L	H	L	X	X	L	X	X	X	X	X	H	L
	L	L	H	L	X	X	H	X	X	X	X	X	L	H
FF	L	L	H	H	X	X	X	L	X	X	X	X	H	L
	L	L	H	H	X	X	X	H	X	X	X	X	L	H
PLAY	L	H	L	L	X	X	X	X	L	X	X	X	H	L
	L	H	L	L	X	X	X	X	H	X	X	X	L	H
PAUSE	L	H	L	H	X	X	X	X	X	L	X	X	H	L
	L	H	L	H	X	X	X	X	X	H	X	X	L	H
REC MUTE	L	H	H	L	X	X	X	X	X	X	L	X	H	L
	L	H	H	L	X	X	X	X	X	X	H	X	L	H
REC SAFETY	L	H	H	H	X	X	X	X	X	X	X	L	H	L
	L	H	H	H	X	X	X	X	X	X	X	H	L	H

H: HIGH Voltege Level
L: LOW Voltage Level
X: Don't Care

Table 3-2. Truth table of operating commands

3-3. MULTIPLEXER FOR AUTO-PRESENT SWITCHES

This multiplexer works to hold a command and transmit it to the controller in order to determine whether to maintain Stop mode or to rewind the tape. after a momentary pause; when the tape has come to a halt by CUE signal during playback and, if the tape is to be rewound, whether to restart playback or not after the tape has been rewound to the beginning end or to the location where the tape counter reads zero. The pin assignments, logic diagram, and truth table of the multiplexer are given below.

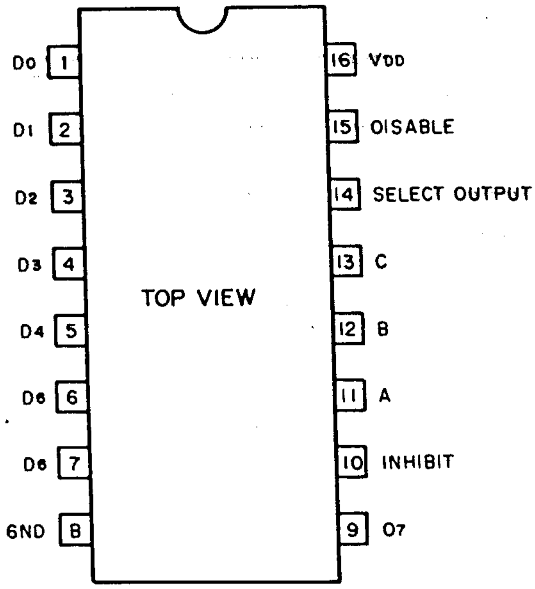


Fig. 3-4. Pin arrangement

	Pin No.	Symbol	Function	Description
Operating command inputs	1	D_0	CUE STOP	Input of the stop signal caused by CUE signal
	2	D_1	CUE REW	Input of the rewind signal that rewinds tape after pause caused by CUE signal
	3	D_2	(Unused)	
	4	D_3	COUNTER STOP	Input of the stop signal caused by counter signal
	5	D_4	COUNTER PLAY	Input of the play signal that plays back tape after pause caused by CUE signal
	6	D_5	BGT PLAY	Input of the play signal that plays back tape after rewinding to the beginning of tape.
	7	D_6	(Unused)	
	8	GND	(Ground)	
	9	D_7	CUE SIG IN	Input for identification of presence or absenee of CUE signal
	10	INHIBIT	(Ground)	
Program code inputs	11	A	Code inputs	Code input 3-bit program address code coming from controller
	12	B	Code inputs	Code input 3-bit program address code coming from controller
	13	C	Code inputs	Code input 3-bit program address code coming from controller
Control outputs	14	SELECT OUT	Output	Executes operating command when output is H.
	15	DISABLE	(Ground)	
	16	V_{DD}	(Power)	+10 V (3 ~ 16 V)

Table 3-3. Pin aseignments

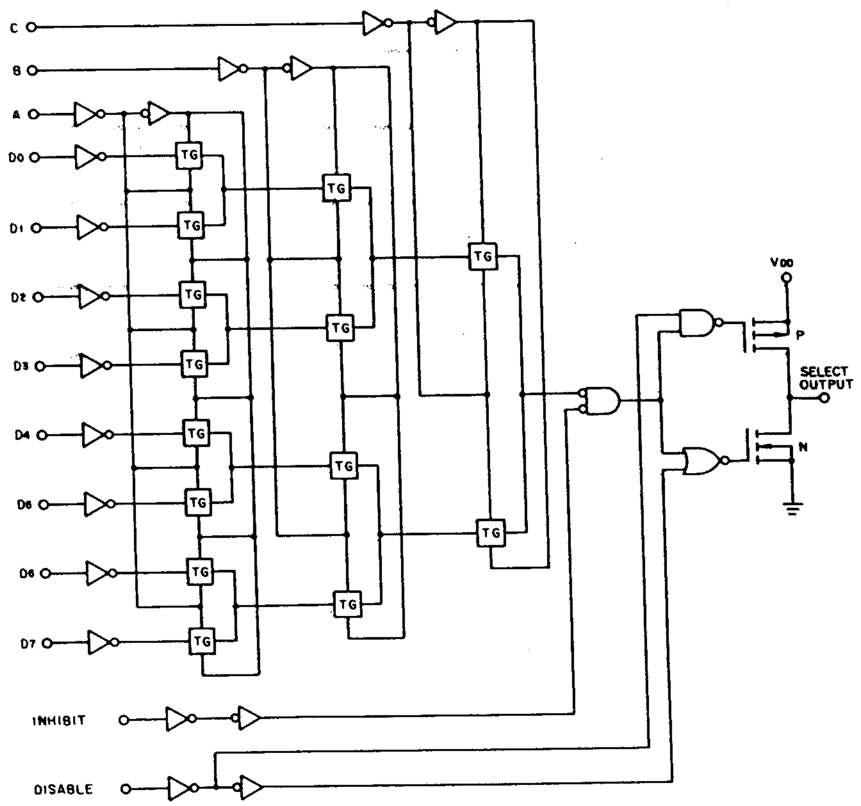


Fig. 3-5 Logic diagram

Operating mode	A	B	C	INHIBIT	DISABLE	SELECT OUTPUT
CUE STOP	L	L	L	L	L	D0 = H
CUE REW	H	L	L	L	L	D1 = H
(Unused)	L	H	L	L	L	D2 = ★
COUNTER STOP	H	H	L	L	L	D3 = H
COUNTER PLAY	L	L	H	L	L	D4 = H
BOT PLAY	H	L	H	L	L	D5 = H
(Unused)	L	H	H	L	L	D6 = ★
CUE SIG IN	H	H	H	L	L	D7 = H
(Unused)	*	*	*	H	L	L
(Unused)	*	*	*	*	H	Z

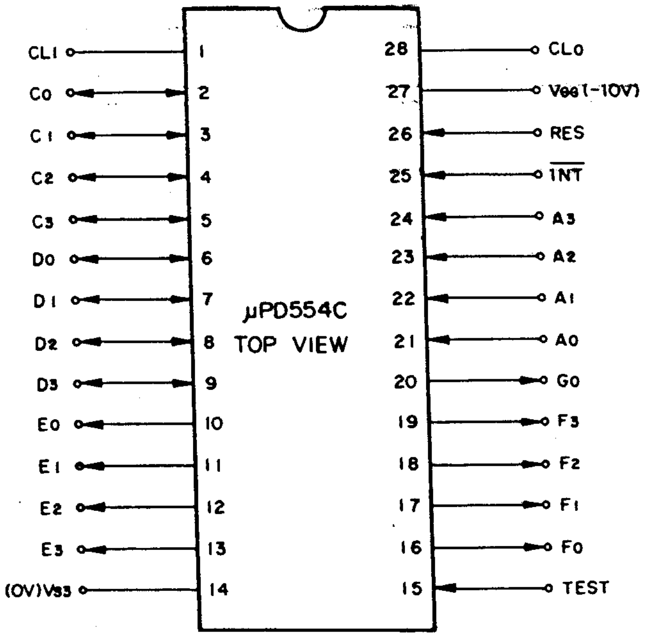
* : Don't Care
Z : High Impedance

Table 3-4. Truth table of operating commands

3-4. CONTROLLER

The controller which is a microprocessor is an LSI developed for controlling a two motor three solenoid tape deck system. This controls all operations of the cassette tape deck with the aid of a program stored in memory. Data of the controller LSI given below will help you understand operations of the tape deck.

3-4-1. Pin assignments



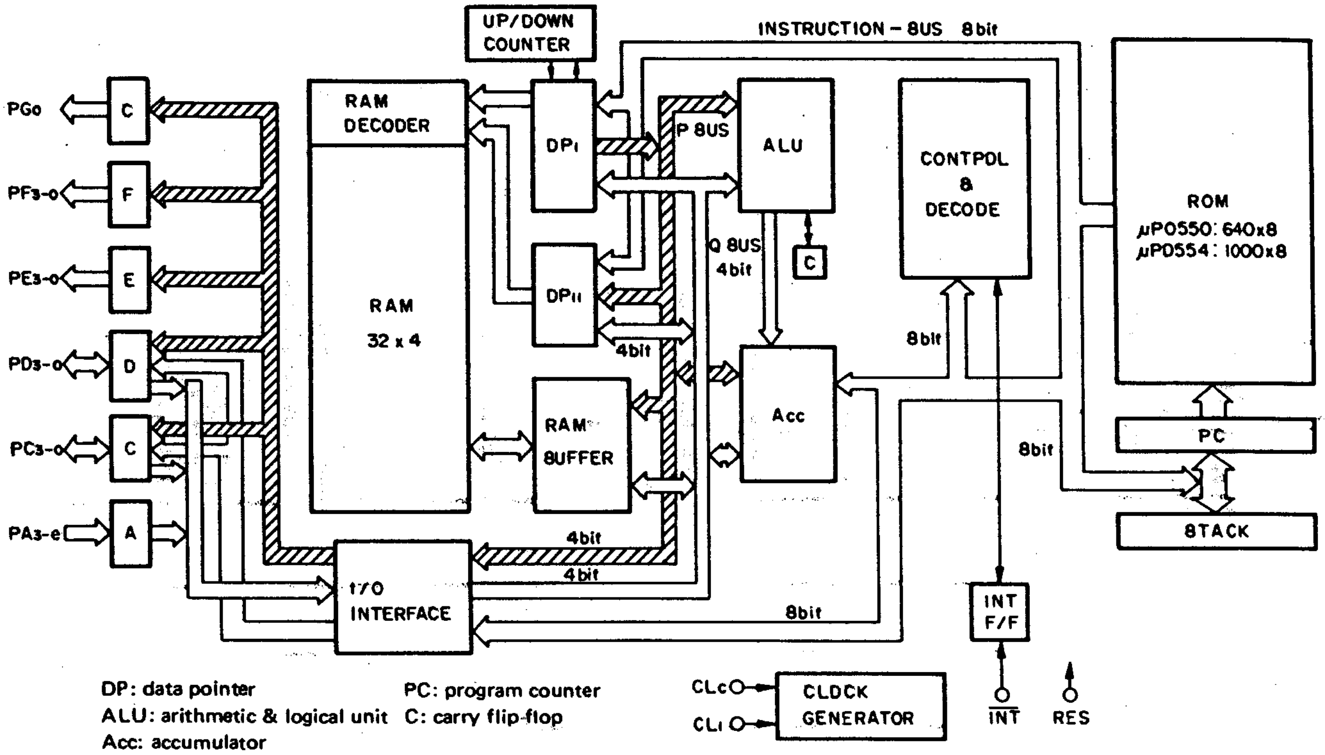
CLI
CO
C1
C2
C3
D0
D1
D2
D3
E0
E1
E2
E3
(OV)VSS
CLO
VGG(-10V)
RES
INT
A3
A2
A1
A0
G0
F3
F2
F1
F0
TEST
µPD554C
TOP VIEW
1
2
3
4
5
6
7
8
9
10
11
12
13
14
28
27
26
25
24
23
22
21
20
19
18
17
16
15

Fig. 3-6. Pin arrangements

Pin No.	Symbol	Function	Level	Remarks
1	CL_1	For clock	–	An oscillator connects across CL_1 and CL_0 (pin 28).
2	C_0	Input selecting address outputs 0 Timer REC input	H H	Outputs input selecting eddress together with C_1 and C_2. Enters timer REC if output of G_0 comes in.
3	C_1	Input selecting address output 1 Timer PLAY input	H H	Outputs input selecting address together with C_0 and C_2. Enters timer PLAY if output of G_0 comes in.
4	C_2	Input selecting address output 2	H	Gutputs input selecting eddress together with C_0 and C_1.
5	C_3	REW output	H	Outputs REW signal.
6	D_0	RED LED output Head type identifying input	H –	Outputs H during REC PLAY and REC PAUSE. Outputs pulse in intervals of approx. 2 seconds when REC SAFETY input is H and not during REC PLAY and REC PAUSE. When G_0 is H, identifities 3-head type if D_0 is H and 2-head type if D_0 is L.
7	D_1	REC MUTE LED output	H	Outputs H during REC MUTE.
8	D_2	PAUSE LED output	H	Outputs H during PAUSE and REC PAUSE.
9	D_3			Unused
10	E_0	Flashing output	H	Flashing circuit control output
11	E_1	Pinch roller solenoid output	H	Outputs H during pinch roller operation.
12	E_2	Head base solenoid output	H	Outputs H during head base solenoid operation.
13	E_3	FF output	H	Outputs FF signal.
14	Vss	Power	–	0 V
15	TEST	Test terminal	–	Must be level with Vss.
16	F_0	POWER/PLAY MUTE output (2-head type) POWER MUTE output (3-head type)	L L	Outputs L during power-on, PLAY, REC PLAY, and REC PAUSE (triggered by RESET or sensing circuit during power-off). Outputs L during power-on for approx. 6 seconds (triggered by RESET or sensing circuit during power-off).
17	F_1	RELAY output (2-head type) PLAY MUTE output (3-head type)	H H	Outputs relay control signal. Outputs PLAY MUTE signal.
18	F_2	REC MUTE output	H	Outputs REC MUTE signal.
19	F_3	BIAS OSC output	H	Outputs bias escillator control signal.
20	G_0	Timer/head type identification output	H	Dutputs H during identification of timer and head type.
21	A_0	Feature mode input	H	Input of Auto-Present hy address (C_0, C_1, and C_2)
22	A_1	Counter signal input	H	If this turns to H during REW, Stop or Play mode will be entered depending on mode preset.
23	A_2	POWER OOWN signal output	L	Power-off is identified by L lasting for more than apprux. 6 seconds.
24	A_3	Operating button input	H	Input of operating button ANDed with address code from C_0 through C_2.
25	INT	Tape travel sensing pulse input	L	Stop mode will be entered if L lasts for more than approx. 2.5 seconds during PLAY or approx. 0.65 seconds during FF and REW.
28	RESET	Reset input	H	Reset if H lasts for more than approx. 10 μsec.
27	VGG	Power	–	–10 V
28	CL_0	Clock input	–	Clock osc connection, used with CL_1, or external clock input.

Table 3-5. Pin assignments

3-4-2. Block diagram


UP/DOWN COUNTER
INSTRUCTION – BUS 8bit
PGo
PF3-o
PE3-o
PD3-o
PC3-o
PA3-e
C
F
E
D
C
A
RAM DECODER
RAM 32 x 4
DPI
DPII
RAM BUFFER
P BUS
Q BUS 4bit
ALU
C
Acc
4bit
4bit
4bit
8bit
8bit
8bit
CONTROL & DECODE
ROM
µPD550: 640x8
µPD554: 1000x8
PC
STACK
I/O INTERFACE
INT F/F
CLo
CLi
CLOCK GENERATOR
INT
RES

DP: data pointer
ALU: arithmetic & logical unit
Acc: accumulator
PC: program counter
C: carry flip-flop

Fig. 3-7. Block diagram

3-4-3. Control program and function addresses

	Address			Auto-present	Operating button
Port	C_2	C_1	C_0	A_0	A_3
6	L	L	L	STOP by CUE signal	Operating button input STOP
1	L	L	H	REW by CUE signal	Operating button input REW
2	L	H	L	Unused	Operating button input REC
3	L	H	H	STOP by counter signal	Operating button input FF
4	H	L	L	PLAY by counter signal	Operating button input PLAY
5	H	L	H	PLAY at the beginning of tape winding	Operating button input PAUSE
6	H	H	L	Unused	Operating button input REC MUTE
7	H	H	H	CUE signal input terminal	REC SAFETY input (H enables recording)

Table 3-6. Operating functions and addresses

3-4-4. Timing diagram

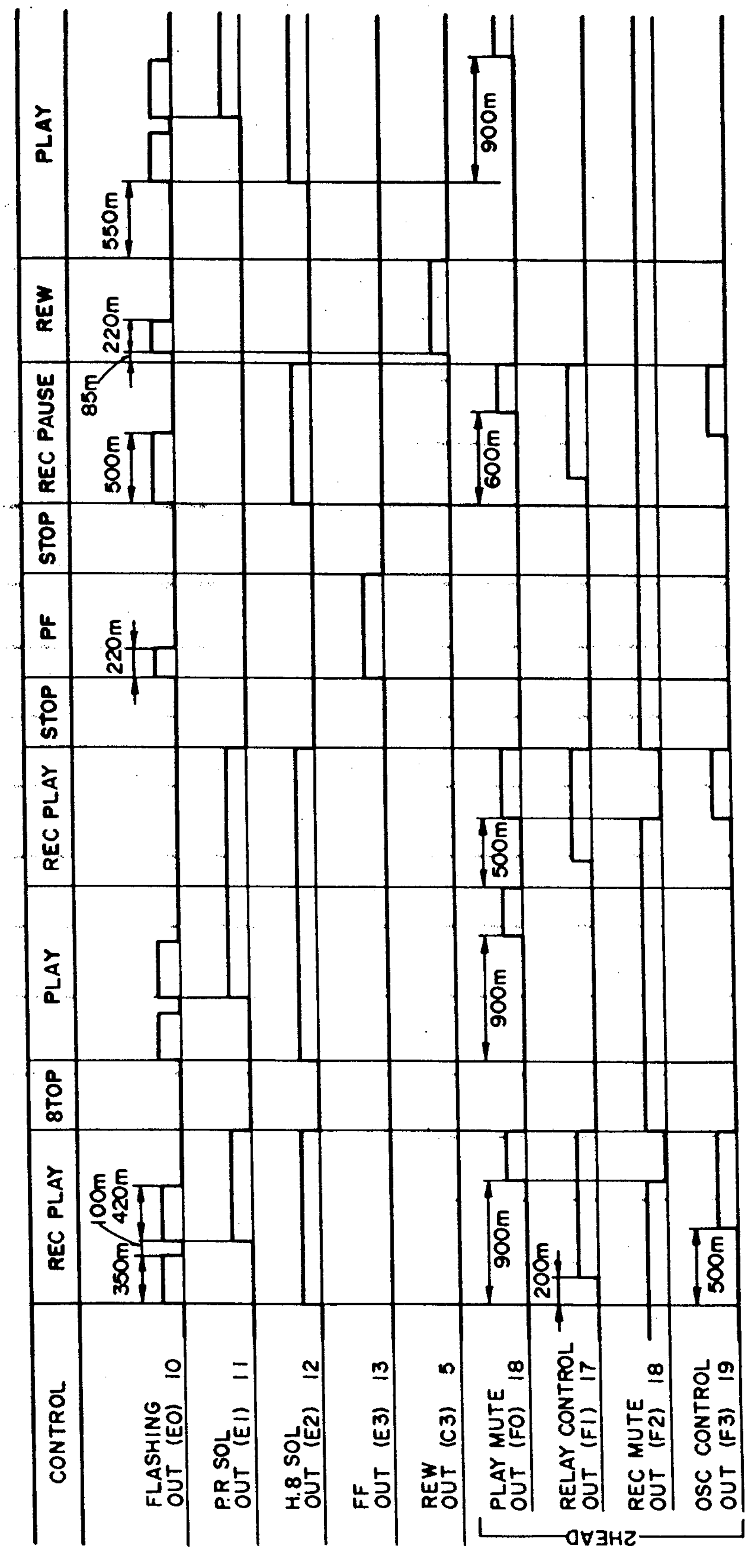

CONTROL
REC PLAY
STOP
PLAY
REC PLAY
STOP
PF
STOP
REC PAUSE
REW
PLAY
FLASHING OUT (E0) 10
P.R SOL OUT (E1) 11
H.8 SOL OUT (E2) 12
FF OUT (E3) 13
REW OUT (C3) 5
PLAY MUTE OUT (F0) 18
RELAY CONTROL OUT (F1) 17
REC MUTE OUT (F2) 18
OSC CONTROL OUT (F3) 19
2HEAD
350m
100m
420m
900m
200m
500m
900m
500m
220m
500m
85m
600m
220m
550m
900m

Fig. 3-8. Timing diagram of control signals

3-5. MOTOR REVERSING IC

The IC that works to reverse the direction of motor rotation is described lastly. This IC does not exchange signals with the controller and, naturally, does not affect controller operation. But knowledge of the IC is necessary for you to understand how the control system operates as a whole. Motor reversing IC U914 (BA6109) incorporates power transistors that drive the reel motor and is capable of reversing motor rotation directly by a signal supplied from the controller. It is also capable of varying the output voltage so as to generate a drive torque which will fit the operating mode of the motor.

3-5-1. Pin assignments

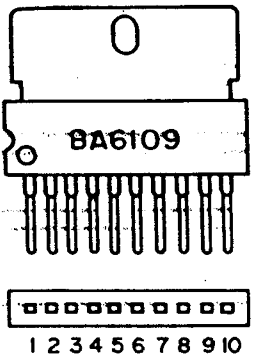


Fig. 3-9. Pin arrangement

Pin No.	Symbol	Description
1	GND	Ground
2	VOUT1	Voltage output
3	VZ1	
4	VR	Output voltage control input
5	FIN	Normal rotation command input
6	RIN	Reverse rotation command input
7	VCC1	Supply voltage input
8	VCC2	Supply voltage input
0	VZ1	
10	VOUT2	Voltage output

Table 3-7. Pin assignments

3-5-2. Block diagram and truth table

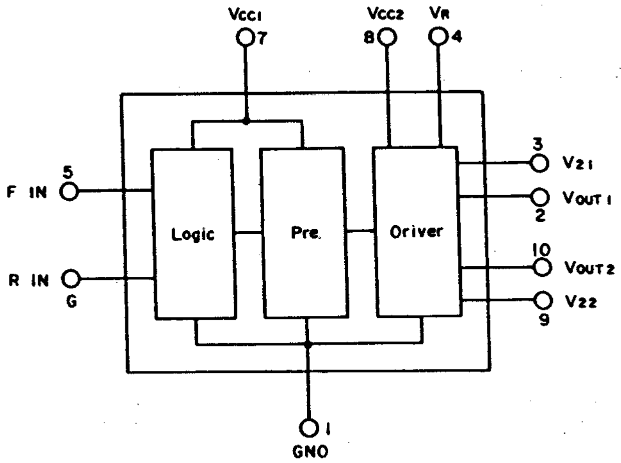


Fig. 3-10. Block diagram

FIN	RIN	VOUT1	VOUT2
H	H	L	L
L	H	L	H
H	L	H	L
L	L	OPEN	OPEN

Table 3-8. Truth table of inputs and outputs

3-6. OPERATION OF THE SYSTEM CONTROLLER

3-6-1. Clock circuit

A train of reference pulses times all operations of the controller, including latching input signals and processing them arithmetically and logically. The pulse train is referred to as clock pulse and its frequency is 400 Hz in the 133B's controller. In the circuit diagram, Q913 forms the clock pulse generator and the output voltage developing at the collector is approx. 10 Vp-p. The clock pulse is applied to clock input port CL0 (pin 28) of the controller IC via coupling capacitor C906.

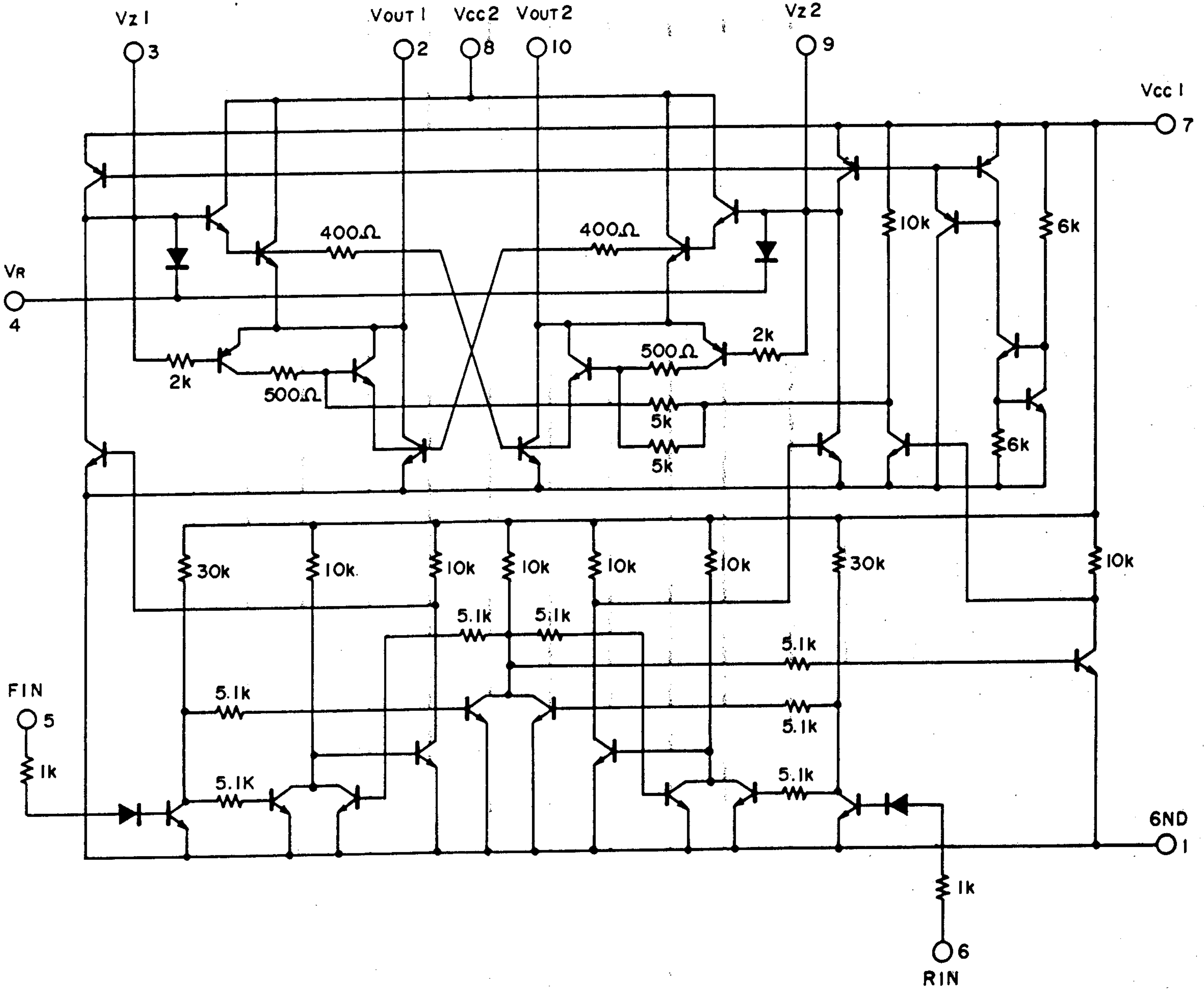

Vz1
3
Vout 1
2
Vcc2
8
Vout 2
10
Vz2
9
Vcc1
7
VR
4
400Ω
400Ω
2k
2k
500Ω
500Ω
5k
5k
10k
6k
6k
30k
10k
10k
10k
10k
10k
30k
10k
5.1k
5.1k
5.1k
5.1k
5.1k
5.1K
5.1k
FIN
5
1k
6ND
1
1k
6
RIN

Fig. 3-11. Equivalent circuit

3-6-2. Initial reset circuit

See Fig. 3-12 and 3-13.

The initial reset circuit generates a signal which puts the deck in Stop mode when power has just been turned on so that the deck should not misoperate as DC voltages are rising.

1) When a cassette tape is not loeded

When the deck is not loaded with a cassette tape, Cassette In Switch S994 is closed to the NO side. This is the state which the deck enters when the STOP button is kept depressed. Therefore, the deck will enter Stop mode as soon as you turn on power.

2) When a cassette tape is loaded

When the deck is loaded with a cassette tape, Cassette In Switch S994 is closed to the NC side and separated from the stop circuit. If you turn on power at this time, +10 V rises gradually. Since it charges capacitor C751 first via path (1), voltage rise at pins 8 and 9 of U751 delays for approx. 2.6 seconds almost equalling the time constant of R753 and C751. At first, therefore, the level at (a) is L. The two NAND gates and R751 inserted between (a) and (c) shape the waveform for sharp rise and decay to secure operation of the circuit. The level at (c) is L since the input voltage is inverted twice. The succeeding NAND gate inverts the L-level again and the level at (d) is H. Thus H-level is applied to the controller's RESET terminal when the DC voltage has not risen sufficiently, and the controller is reset. This prevents the controller from operating erroneously.

When the DC voltage has risen sufficiently and capacitor C751 is completely charged, level turns to H at (a), L at (b), H at (c), and L at (d). As a result, the reset signal of the controller is released.

Next, let us see how the circuit operates when you turn off power.

Capacitor C752 is charged by the DC voltage via path (2). If you turn off the power, the voltage at the base of transistor Q751 falls below the voltage across capacitor C752 and, therefore, base current flows from C752 via path (3). This turns on Q751 and permits current to flow via path (4). This current turns pins 5 and 6 of U751 to H-level and U751 outputs L-level at pin 4. Therefore, charges storaged in C751 flows out via path (5) and level turns to L at (a). As (a) is at L-level, (d) is at H and the controller gets reset as explained first. A small time constant is selected for path (5) and the controller will be reset immediately when power gets turned off. Thus the system is protected from erroneous operation at the time of power-off.

3-7. COMMAND INPUT CIRCUIT

The controller LSI (μPD554-80) controls the system extensively according to commands. The command input circuit permits proper command input to the controller. As briefed in Section 3-1, two multiplexers, operating key switches, and Auto-Present rotary switch, etc, are connected to the controller (see next page).

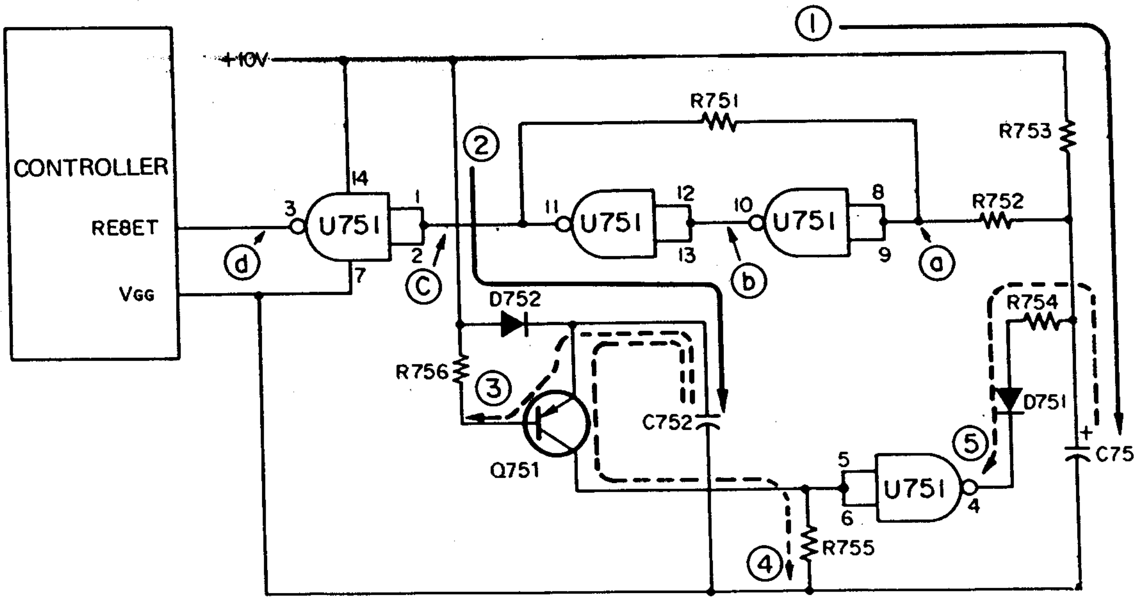


Fig. 3-12. Initial reset circuit

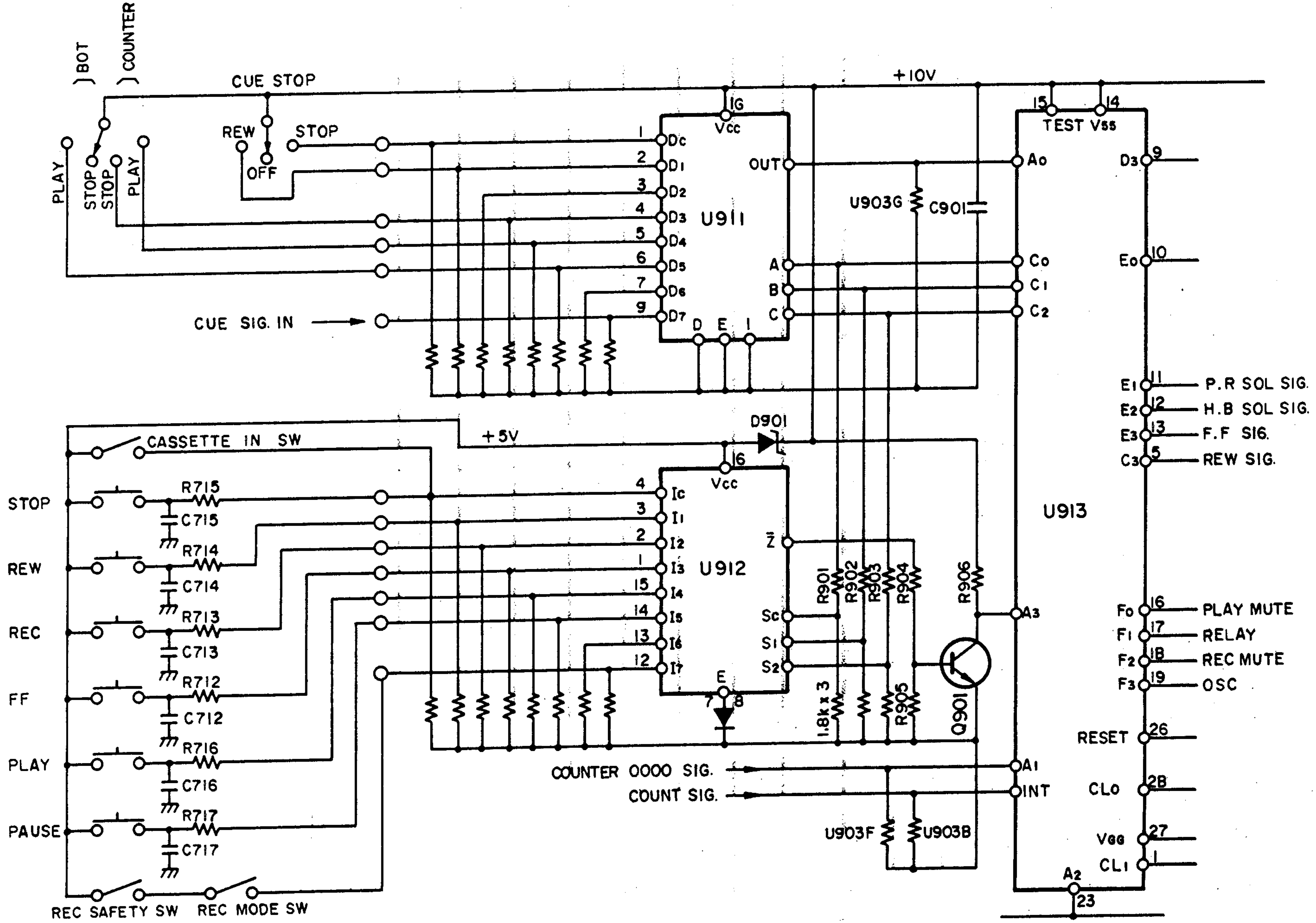

BOT
COUNTER
PLAY
STOP
STOP
PLAY
CUE STOP
REW
OFF
STOP
CUE SIG. IN
+10V
1G
Vcc
U911
Dc
D1
D2
D3
D4
D5
D6
D7
OUT
A
B
C
D
E
I
U903G
C901
15
14
TEST Vss
A0
D3
9
C0
C1
C2
E0
10
E1
E2
E3
C3
11
12
13
5
P.R SOL SIG.
H.B SOL SIG.
F.F SIG.
REW SIG.
U913
CASSETTE IN SW
+5V
D901
16
Vcc
U912
Ic
I1
I2
I3
I4
I5
I6
I7
Z
Sc
S1
S2
E
7
8
R901
R902
R903
R904
R905
R906
1.8k x 3
Q901
A3
F0
F1
F2
F3
16
17
18
19
PLAY MUTE
RELAY
REC MUTE
OSC
RESET
26
CL0
28
Vgg
27
CL1
1
A1
INT
A2
23
COUNTER 0000 SIG.
COUNT SIG.
U903F
U903B
STOP
REW
REC
FF
PLAY
PAUSE
R715
C715
R714
C714
R713
C713
R712
C712
R716
C716
R717
C717
REC SAFETY SW
REC MODE SW

Fig. 3-13. Controller input circuit

A. Command input with operating keys (buttons)

The stored control program causes the controller to keep watch of the states of the operating keys and other input signals (commands). If you depress the REC key, for example, port I2 of U912 turns to H-level. On the other hand, the controller outputs a 3-bit address code through its output ports (C0—C2) to the input ports (S0—S2) of multiplexer IC U912. U912 outputs L-level at output port Z when I2 is at H and S0—S2 are respectively at H, L, and L (see Table 3-4). The L-level at $\bar{Z}$ is inverted by transistor Q901 and applied to port A3 of the controller. When H is applied to A3, the controller identifies the REC as depressed. Next, the controller applies signals L, L, and H to S0—S2 to see whether or not the PLAY button is depressed. If PLAY is depressed at this time, the multiplexer is at H-level at I4 and, as a result of AND with the signals of S0—S2, outputs L-level. This permits the controller to identify the PLAY button as depressed. (If the PLAY button is not depressed, the output level at $\bar{Z}$ is H and the input to the controller is L. As a result, the controller identifies the PLAY button as not depressed. Naturally, no control signals used for recording operation are generated.) In the same way, the controller checks whether or not port I7 of multiplexer IC U912 is at H-level (i.e. whether or not the tab of the cassette is removed; and REC mode is set for at least one of the three channels.) Thus the control program forces the controller to check all requirements for performing recording and generate signals needed for recording operation if the requirements are met.

In the other operating modes, the controller actually operates in the same way to check command and generates needed control signa's.

Figure 3-8 shows the timing of control signals in relation to operating commands. A specific sequence of control signals totally control the tape drive mechanism and amplifier.

B. Command input with operating switches (Auto-Present)

In this case, too, the way of inputting commands and how the controller checks commands are the same as when using the operating keys. More detail will be given later.

3-8. SOLENOID DRIVE CIRCUIT

3-8-1. Fast solenoid drive circuit

See Fig. 3-14.

As described before, the controller outputs a flashing pulse at pin 10 (see Fig. 3-8) and H-level at pin 13 (at pin 5 during REW) during a Fast mode (F.FWD or REW).

During F.FWD the Fast solenoid operates as follows.

a. Controller U913 outputs H-level at pin 13.

b. The H-level applies to the base of transistor Q911 via resistor U901C, thereby turning it on. Now the Fast solenoid is grounded at an end.

c. On the other hand, U913 outputs flashing pulse whose width is 220 msec at pin 10.

d. The flashing pulse applies to the base of transistor Q906, thereby turning it on. As Q906 is on, its base current turns on Q907. Now the high level developing at Q907's emitter applies

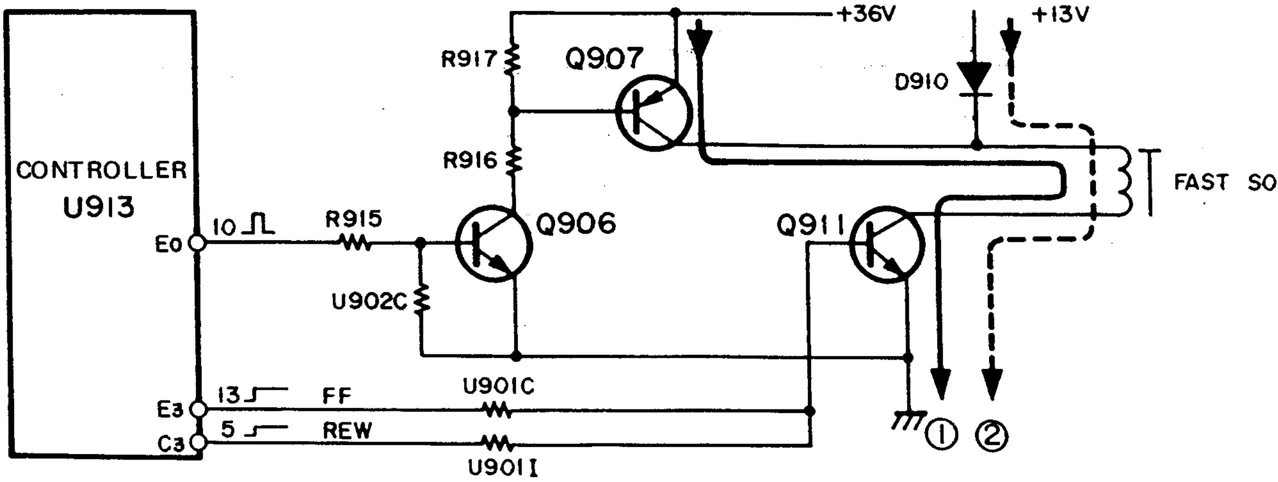


Fig. 3-14 Fast solenoid drive circuit

to the other end of the Fast solenoid via Q907 and flashing current flows through the solenoid via path (1) for 220 msec. This current causes the solenoid to operate.

e. In 220 msec, the output of the controller at P10 falls to L-level, thereby turning off transistor Q906. As Q906 is off, Q907 turns off and stops delivering the high voltage developing at its emitter to the solenoid.

f. The terminal of the solenoid which connects to Q907 is also connected to the power line of approx. 13 V via diode D910 and current continues to flow to the solenoid via the diode and path (2). This current maintains the current state of the solenoid.

Thus varying voltages (currents) are supplied to the solenoid for driving and holding it. The large drive current produces a large mechanical power in the solenoid to secure operation. The small holding current protects the solenoid from heating up. We call the circuit that controls supply voltage of the solenoid in this way the "flashing circuit" and the large drive current "flashing current".

When REW mode is selected, controller IC U913 outputs an H-level signal which turns on transistor Q911 in the same manner as in F.FWD mode. Operation of the flashing circuit is the same as in F.FWD mode but that the flashing current begins to flow with a delay of approx. 65 msec.

When the Fast mode has been released (for example, the STOP button has been depressed during F.FWD or REW mode), operation proceeds as follows.

g. The controller outputs L-level at pin 13 (F.FWD) or at pin 5 (REW).

h. With the base current cut off, transistor Q911 turns off. Now the solenoid is cut off from the circuit and, because holding current flows no longer, it gets released.

3-8-2. Head base solenoid drive circuit

See Fig. 3-15.

This solenoid operates during PLAY, PAUSE, REC/PLAY, and REC/PAUSE. The controller generates signals which control the head base solenoid during these modes (see Fig. 3-8). The timing diagram (Fig. 3-8) shows that, even in a certain operating mode (REC/PLAY, for example), the controller provides head base control pulse at varying timing depending on whether REC/PLAY mode is entered initially or transferred from PLAY mode. The same thing occurs with flashing control pulse. The reason for [illegible] is as follows. To change REW mode to PLAY mode, it is required to raise the head base after the tape has stopped and, therefore, to delay the head base control pulse for the time interval which the tape takes to stop traveling. For this reason, head base solenoid operation should be explained separately for each mode for exactness. However, it is described here only for when PLAY mode is entered from STOP mode. You may refer to the timing diagram for information of delay.

a. When the PLAY button has been depressed, controller IC U913 outputs a flashing circuit control signal (H-level) at pin 10 and a head

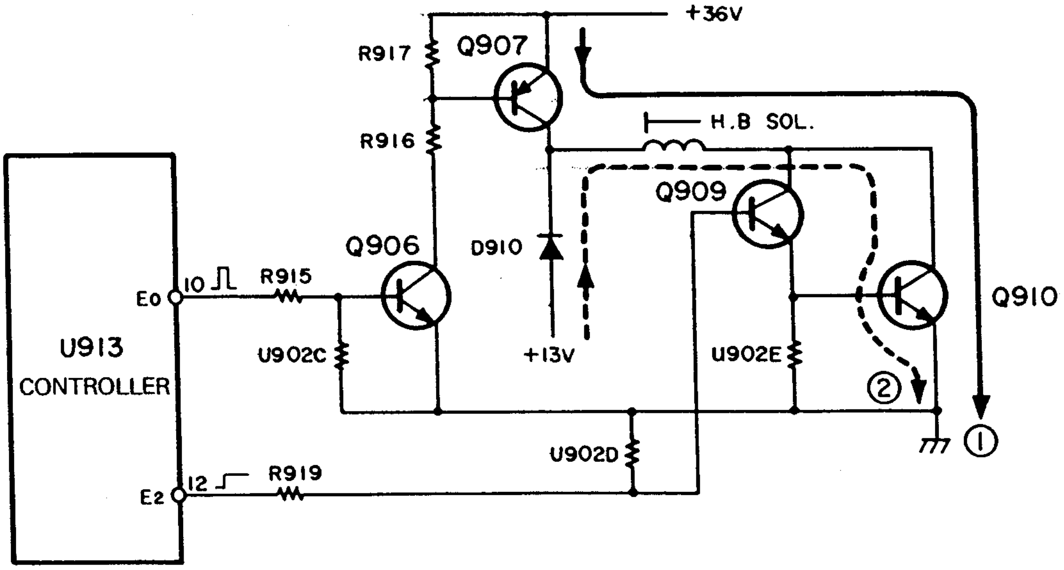


Fig. 3-15. Head base solenoid drive circuit

base solenoid control signal (H-level) at pin 12 at the timing shown in the timing diagram.

b. The H-level of pin 12 applies to the base of transistor Q909 via resistor R919, thereby turning it on. As Q909 is on, base current flows through Q910 and it turns on. Now the one end of the head base solenoid is grounded via Q111.

c. On the other hand, the flashing control signal of pin 10 turns on Q900 and Q907 which permits a high voltage to be applied to the other end of the solenoid (this process is the same as operation of the Fast solenoid drive circuit). As a result, a large current flows through the solenoid via path (1) and causes it to operate.

d. When the flashing control signal disappears, Q906 and Q907 turn off and the flashing current stops flowing. However, the current state of the solenoid is maintained since holding current continues to flow through the solenoid via diode D910 and path (2) just as with the Fast solenoid drive circuit.

3-8-3. Pinch roller solenoid drive circuit

See Fig. 3-16.

The pinch roller solenoid drive circuit operates basically in the same manner as the Fast solenoid drive circuit. The difference is that the controller supplies a control signal from pin 11 to the base of transistor Q908 to turn it on. When it is on, one end of the pinch roller solenoid gets groundad.

As the timing diagram shows, the pinch roller solenoid control signal is output with a delay of 450–550 msec to the head base solenoid control signal. This permits the tape to start traveling after the head base had moved completely to its position and the head has come into close contact with the tape.

3-9. REEL MOTOR DRIVE CIRCUIT

3-9-1. Direction of motor rotation

The reel motor drives the left or right reel disk to take up the tape. Torque is transmitted from the reel motor to one of the reel disks during the reproduce, fast-forward, and rewind modes by the processes shown in Fig. 3-17 – 3-19 (as seen from the front of the deck). As seen from Fig. 3-17 and 3-19, the reel motor rotates in the same direction during the reproduce and rewind modes and the fast-forward pulley mechanically selects either the left or right reel disk and drives it in accordance with the direction of reel motor rotation. In the pause mode, the reel motor does not rotate.

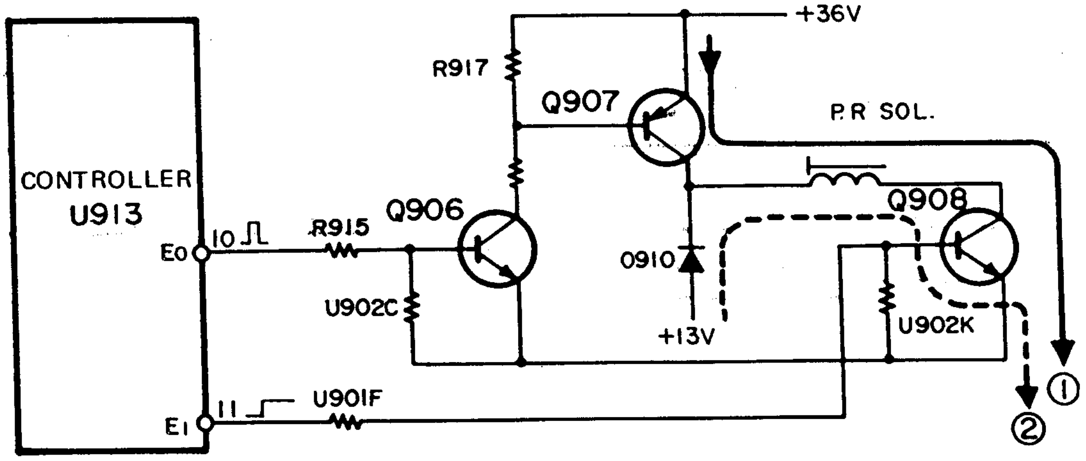


Fig. 3-16. Pinch roller solenoid drive circuit

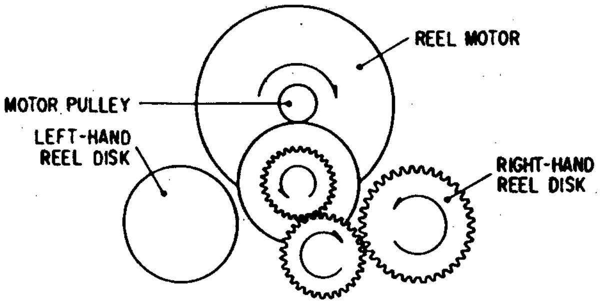

REEL MOTOR
MOTOR PULLEY
LEFT-HAND REEL DISK
RIGHT-HAND REEL DISK

Fig. 3-17. Reel disk drive (reproduce mode)

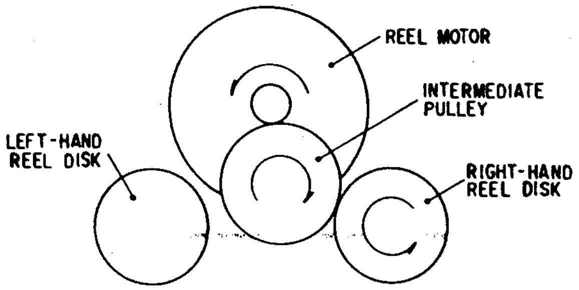

REEL MOTOR
INTERMEDIATE PULLEY
LEFT-HAND REEL DISK
RIGHT-HAND REEL DISK

Fig. 3-18. Reel disk drive (fast-forward mode)

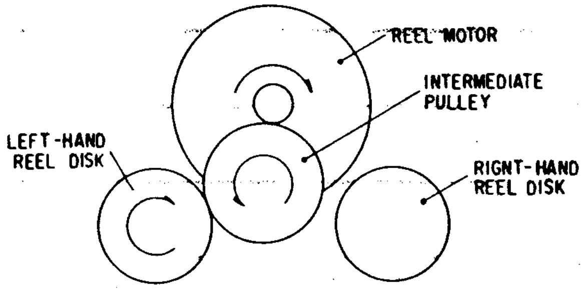

REEL MOTOR
INTERMEDIATE PULLEY
LEFT-HAND REEL DISK
RIGNT-HAND REEL DISK

Fig. 3-19. Reel disk drive (rewind mode)

3-9-2. Motor drive circuit

See Fig. 3-20.

The motor drive circuit uses the motor reversing IC described in Section 3-4. With control signals supplied from the controller, the logic gates of the IC automatically control the direction and speed of the motor rotation.

First, let us examine the input signals of IC U914.

a. In PLAY mode

The H-level output at pin 11 of the controller is transmitted to input terminal RIN of U914 via U901G and U901L. On the other hand, the L-level output at pin 13 of the controller is transmitted to input FIN of U914 via pin 13 of U913 and resistor U901B.

b. In REW mode

The H-level developing at pin 5 of U913 is transmitted to RIN of U914 and the L-level of U913's pin 13 to FIN.

c. In F.FWD mode

The H-level developing at pin 13 of U913 is transmitted to FIN of U914 and the L-level of U913's pin 5 to RIN.

Table 3-9 summarizes the states of the input signals described above.

Mode	Input signals		Output signals		Motor state
	RIN	FIN	VOUT1	VOUT2	
PLAY	H	L	L	H	Forward rotation
REW	H	L	L	H	Forward rotation
F.FWD	L	H	H	L	Reverse rotation
STOP	L	L	OPEN	OPEN	Motor power off

Table 3-9. Motor reversing operation

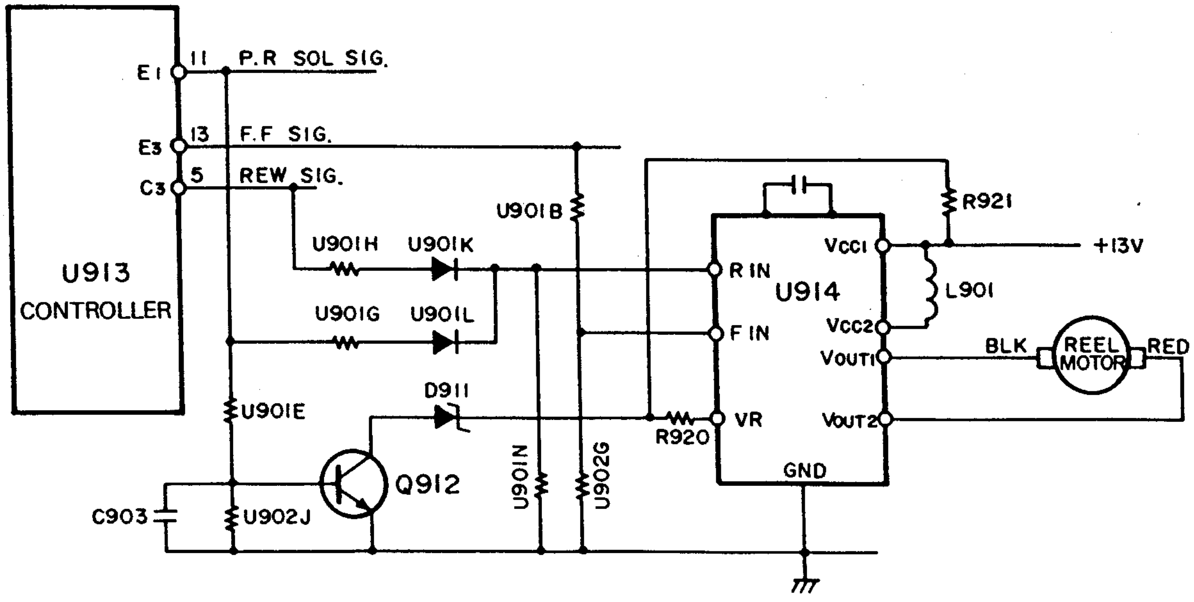

U913
CONTROLLER
E1
11
P.R SOL SIG.
E3
13
F.F SIG.
C3
5
REW SIG.
U901B
U901H
U901K
U901G
U901L
U901E
D911
Q912
U901N
U902G
C903
U902J
R921
Vcc1
+13V
RIN
U914
L901
FIN
Vcc2
Vout1
BLK
REEL MOTOR
RED
VR
Vout2
R920
GND

Fig. 3-20. Reel motor drive circuit

From the truth table of U914, we also find the states of the output terminals as given in Table 3-7. As the reel motor is connected across Vout1 and Vout2, drive current flows from RED to BLK (see Fig. 3-19) and drives the motor to run forward during PLAY and REW modes. During F.FWD mode, drive current flows from BLK to RED and the motor reverses the direction of rotation. Except in PLAY mode, a voltage (13 V) which is close to the supply voltage is applied to terminal VR of U914 for the reason described below so that a voltage as high as approximately 11.5 V developing across Vout1 and Vout2 drives the motor at high speed.

In PLAY mode, the voltage is reduced to about 4.5 V. The reason that the drive voltage is varied is described below.

The H-level output at pin 11 of controller IC U913 during PLAY mode is applied to the base of transistor Q912 via resistor U901E with a delay (of 1.2 sec) which capacitor C903 determines together with U901E. Q912 remains cut off for the delay time and, during this time, the supply voltage is applied to the terminal VR of IC U914 that controls reel motor drive voltage via resistors R921 and R920. Therefore, the voltage across Vout1 and Vout2 is high to provide the reel motor with enough starting torque.

After the delay time (1.2 sec) which C903 and U901E determine has elapsed, the base of Q912 rises to H-level and base current flows through it. This turns on Q912, and terminal VR of U914 gets locked to a level (approx. 5.1 V) which is close to the zener voltage of zener diode D911 connected to Q912's collector. Now some gates of the IC reduce the voltage across Vout1 and Vout2 approximately to 4.4 V to provide the reel motor with a drive torque which is just enough to keep it running in PLAY (REC/PLAY) mode.

3-10. CAPSTAN MOTOR DRIVE CIRCUIT

See Fig. 3-21.

The capstan motor operates during PLAY(REC/PLAY) and PAUSE (REC/PAUSE) modes. Its rotation is transmitted by belt to the flywheel and further to the flywheel shaft which is just the capstan shaft.

During PLAY, REC/PLAY, and REC/PAUSE modes, controller IC U913 outputs H-level at pin 12 (output terminal of head base solenoid control signal). The H-level developed at pin 13 is applied to the base of transistor Q909, thereby turning it on. As Q909 is on, Q910 also turns on, thereby closing the ground line of the servo amplifier via D991. The hot line of the servo amplifier is directly connected to the supply power. Therefore, as soon as the ground line gets closed, the servo amplifier operates and the capstan motor starts. Capstan motor speed may be selected out of STD (tape speed: 4.76 cm/sec) and HIGH (9.5 cm/sec) with SPEED switch S11-2.

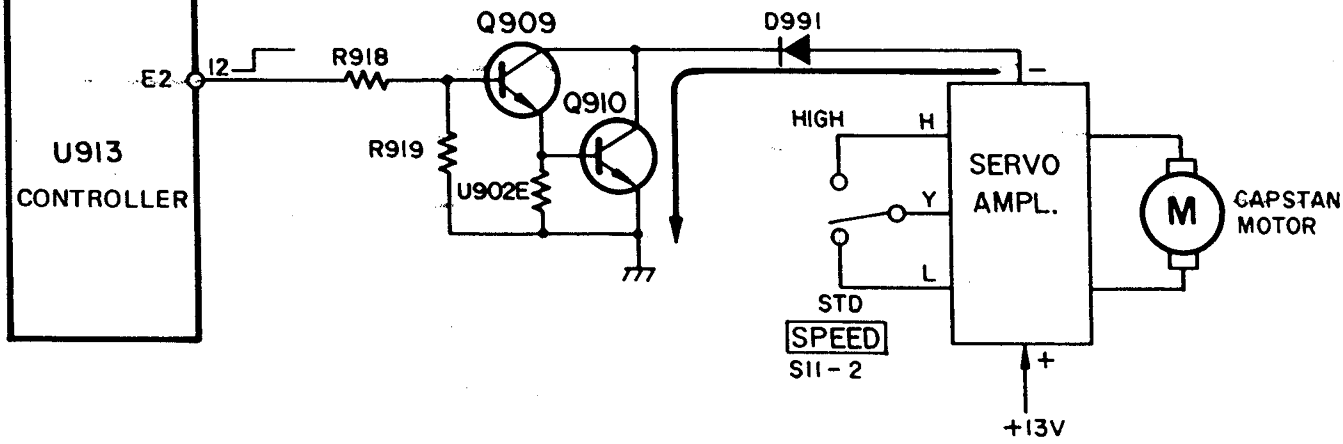


Fig. 3-21. Capstan motor drive circuit

3-11. TAPE COUNTER CIRCUIT

See Fig. 3-23.

This tape deck employs an electronic counter with digital display of LEDs. Because of this, it is required to electronically detect the state, running or stationary, of the tape and its direction of rotation. This is performed by two pairs of photocouplers fitted to the drum which is beneath the right-side reel disk and has eight slits. When the drum rotates, the slits pass between each pair of LED and phototransistor and, at this time, the phototransistors generate current. As the reel disk rotates once, each phototransistor generates eight pulses. The two pairs of photocouplers are laid in such a manner that their output pulses are 90° out of phase mutually (see Fig. 3-22). This permits detection of tape travel direction as described later.

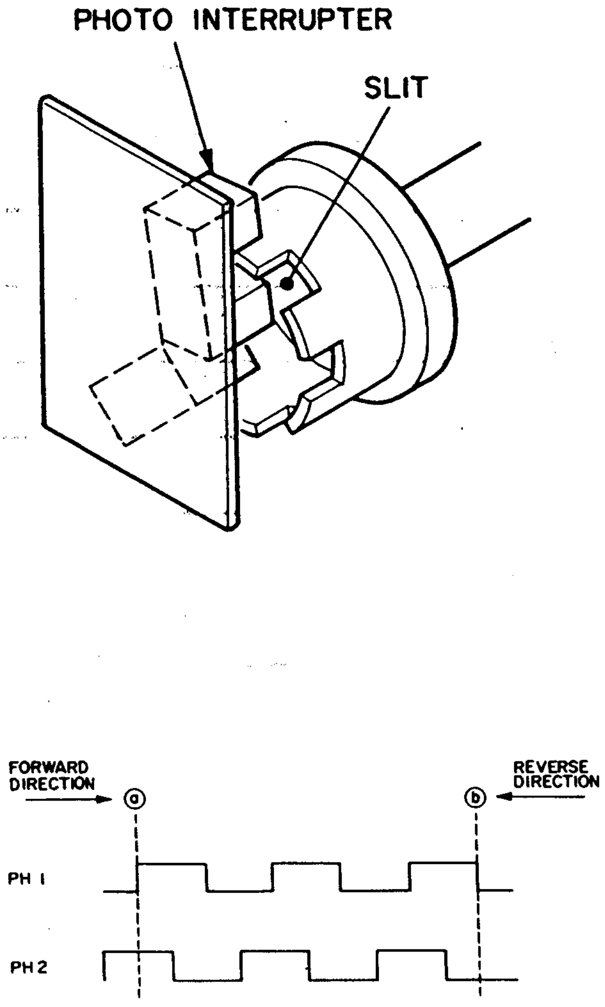


Fig. 3-22. Photocoupler and its output pulse

3-11-1. Tape counter

As already described, photocouplers PH1 and PH2 generate pulses as the reel disk rotates. The waveform of the pulse signal is not square but sinusoidal because of the waveform of the light emitted to the phototransistor through the slits. The waveform shaping circuit inserted in each photocoupler circuit shapes the pulse signal into square pulse. The shaped pulse passes through inverter U404 (pins 11 and 12) and, after resistor R488 and capacitor C433 have delayed it approximately by 100 μsec, comes to an inverter again.

One component of the delayed pulse enters U407 (pin 1), and the other comes to pins 5 and 6 of NAND gate U407. The pulse inverted by the NAND gate is delayed for approximately 100 μsec by R456 and C427, then comes to pin 2 the NAND gate. Because the input to pin 2 the NAND gate is delayed for 100 μsec, the put voltages of both gates 1 and 2 remain at H-level for 100 μsec. Therefore, the NAND gate outputs pulse whose L-level lasts for 100 μsec. This pulse is applied to two input gates of the succeeding NAND gate unit. As a result, the pulse signal applied to the input port (pin 14) of the tape counter drive IC U406 has H-level lasting for 100 μsec. This counter input circuit has a 1/5 frequency divider and the counter increments or decrements by one as five pulses come in (whether to increment or decrement is determined by the state of UP/DOWN input described below). Since eight pulses are generated as the reel disk rotates once, the counter reading changes by one for every five-eighth rotation of the reel disk.

a. Detection of tape travel direction

The outputs of photocouplers PH1 and P whose waveforms have been shaped come input terminals C and D of U405 (1/2) which detects the direction of tape travel. The output pulses of PH1 and PH2 are 90° out of phase as shown in Figure 3-22. When the tape is traveling forward, U405 (1/2) outputs H-level (identifying forward travel) by ANDing inputs (C and D both at H) at the moment of (a). When the tape is reversing, U405 (1/2) outputs L-level since it ANDs inputs (C at H and D at L) at the moment of (b). Thus the direction of tape travel is detected. The output signal identifying tape travel direction is applied to pin 12 (UP/DOWN) of counter drive IC U406 to tell the counter whether to increment or decrement.

b. LED blanking

If the counter LEDs are active immediately after power-on, the counter might operate erroneously as when a logic error has happened due to transient voltage. A delay voltage applied to pin 7 (blanking signal in) of the counter driver IC prevents such an event. The delay voltage circuit is composed of resistor R459, capacitor C430, and zener diode D410. As the supply voltage of +10 V is applied to R459, current flows through it, thereby charging C430. Until the voltage across C430 exceeds the zener voltage of D410, no voltage is applied to pin 7 of U406 and the counter LEDs remain unlit during this time. The delay time which is the time constant of R459 and C430 is approximately 220 msec.

From the tape status signals described above, U400 finally generates LED segment drive signals which are supplied to 28 segments (= 7 segments x 4 LEDs) via resistors.

c. Counter reset

The tape counter will be reset when RESET switch S13 is depressed and H-level is applied to pin 10 (reset) of U406. Besides, if the counter is decrementing, U406 generates a signal (H-level lasting for approx. 100 μsec) a little bit before the counter reads zero (i.e. when the reading is around 3 – 5). This signal causes the tape to stop traveling just when the counter reads zero. The advance of timing takes into consideration inertia of the tape transport mechanism so that the tape should stop exactly when the counter reaches zero. The line of this signal is connected to A1 of the controller IC so that the signal is used to stop tape travel or resume playback when the counter has read zero in REW mode.

d. Tape end detection

The tape end is detected by making use of the fact that COUNT SIG OUT (see Fig. 3-23) turns to L when the tape stops traveling. This signal is applied to pin 25 (INT) of the controller IC. If the L-level lasts for more than 2.5 seconds during PLAY mode, the controller generates STOP signal and sets all functions in Stop mode. The controller also sets all functions in Stop mode if the L-level lasts for more than 0.65 second during F.FWD or REW mode.

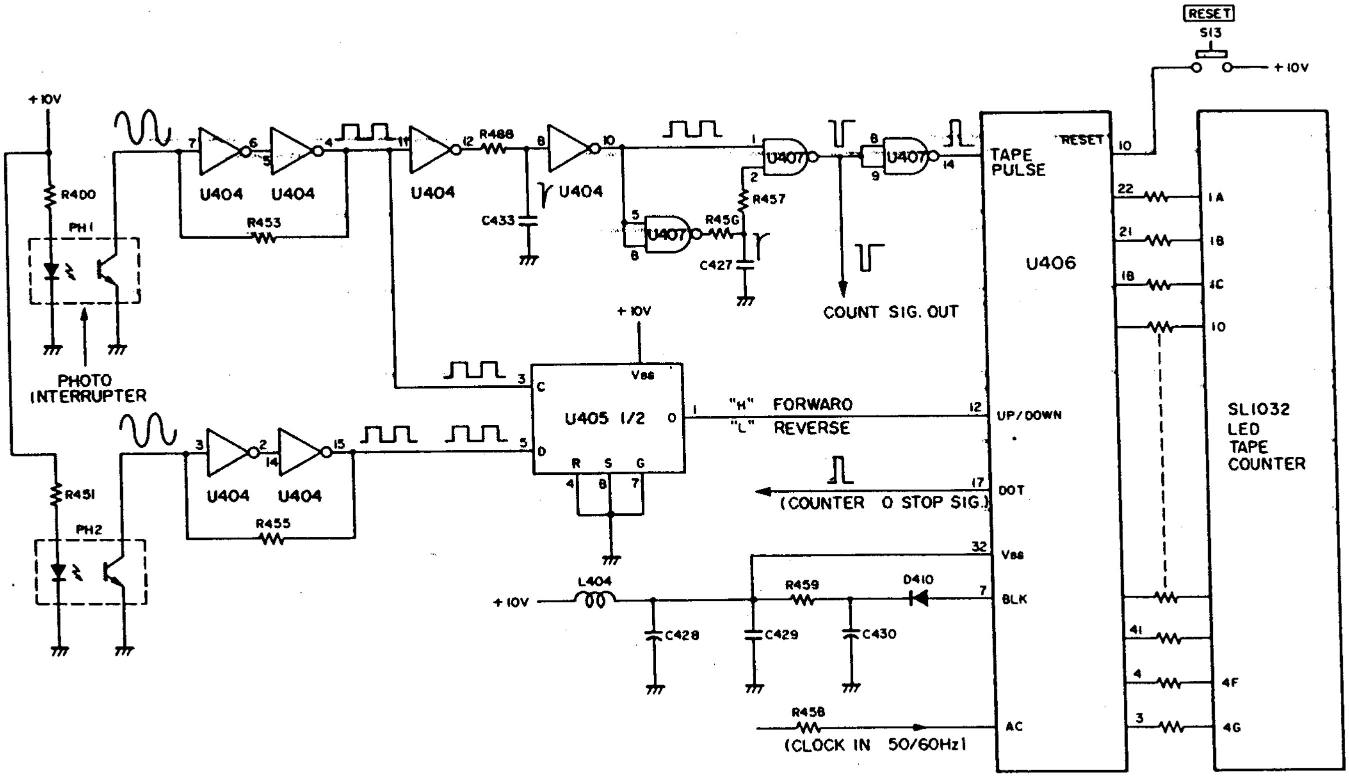

RESET
S13
+10V
+10V
R400
PH1
PHOTO INTERRUPTER
R451
PH2
U404
R453
R455
R488
C433
U407
R457
R456
C427
COUNT SIG. OUT
TAPE PULSE
RESET
U406
UP/DOWN
DOT
VSS
BLK
AC
U405 1/2
VSS
C
D
R S G
"H" FORWARD
"L" REVERSE
(COUNTER 0 STOP SIG.)
L404
R459
D410
C428
C429
C430
R458
(CLOCK IN 50/60Hz)
SL1032 LED TAPE COUNTER
1A
1B
1C
1D
4F
4G

Fig. 3-23. Tape counter circuit

CUE SIGNAL SECTION

3-12. CUE SIGNAL REPRODUCING CIRCUIT

See Fig. 3-24.

The CUE signal reproducing circuit is basically the same as the audio signal reproducing circuit. The only difference is that there is no Dolby NR decoder in it. So, it is simply explainad below.

a. Relay switch K301-1 switches the head to PLAY.

b. Play head amplifier U301 is provided with a negative feedback network in between its output terminal and inverted input terminal in order to compensate playback characteristics according to the tape speed. At this time, Speed switch S11-1 turns on or off FET switch Q301 to make frequency response and gain fit the tape speed. When High speed is selected, Q301 is on, which shorts resistor R308. When normal speed is selected, Q301 is off and R308 works. Thus the amplifier characteristics are varied.

c. The semi-fixed variable resistor permits adjustment of the playback level.

d. R312 and C309 compensate frequency response at high frequencies. C310 and L301 form a bias trap.

e. FET switch Q303 is turned on during PLAY mode by relay switch K301-2. Transistor switch Q304 is off during PLAY mode because the base is at L-level. Therefore, CUE signal comes in to preamplifier U301.

f. The L-C parallel resonance circuit connected to the inverted input of preamplifier U301 is the recording bias signal trap. Capacitor C334 connecting across the input and output compensates phase to stabilize operation of the operational amplifier.

g. The signal thus amplified then enters the meter amplifier and the output amplifier.

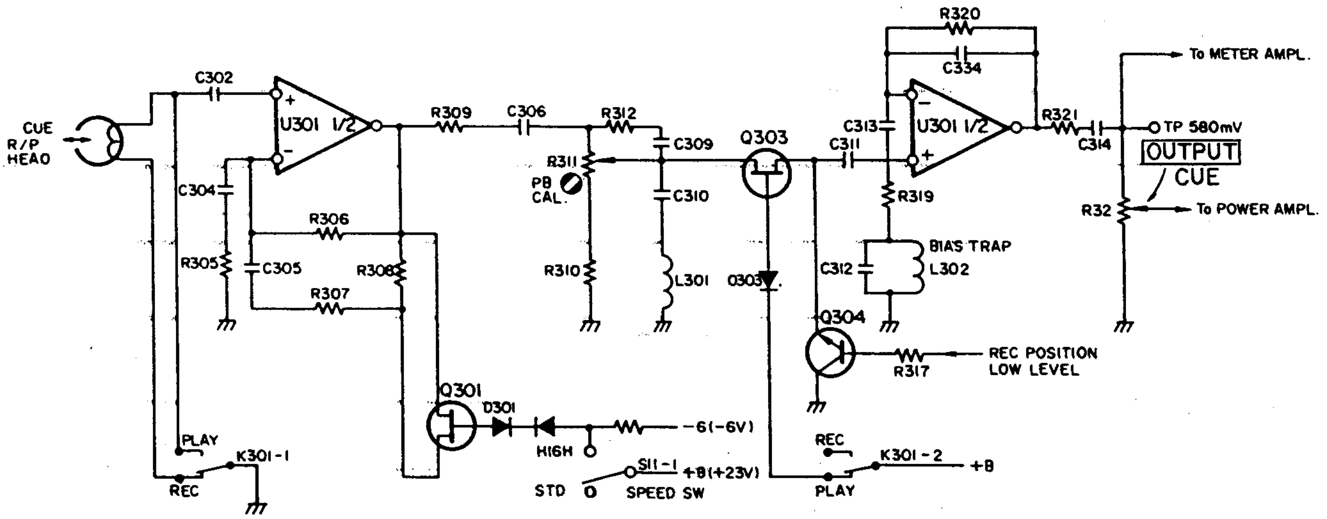

CUE
R/P
HEAD
C302
U301 1/2
C304
R305
C305
R306
R307
R308
R309
C306
R312
R311
PB
CAL.
C309
C310
R310
L301
Q303
D303
C313
C311
R320
C334
U301 1/2
R319
BIAS TRAP
C312
L302
Q304
R317
REC POSITION
LOW LEVEL
R321
C314
To METER AMPL.
TP 580mV
OUTPUT
CUE
R32
To POWER AMPL.
Q301
D301
-6(-6V)
HIGH
STD
S11-1
+B(+23V)
SPEED SW
PLAY
K301-1
REC
REC
K301-2
+B
PLAY

Fig. 3-24. CUE signal reproducing circuit

3-13. CUE SIGNAL OUTPUT CIRCUIT

See Fig. 3-25.

The circuitry is the same as that of the audio signal output amplifier. They have the same gain. Namely, it is 4.4 dB at the normal speed and 14.6 dB at the high speed. Thus the difference of 10 dB is provided. Muting circuit Q308 also operates the same as the audio output circuit does.

3-14. CUE SIGNAL PEAK LEVEL METER CIRCUIT

See Fig. 3-26.

The level meter reads the peak level of signal since CUE signal normally has a pulse-like waveform.

1) Play peak level meter circuit
   a. One component of the signal reproduced and amplified by preamplifier U301 comes to the hot side of OUTPUT VR R32.

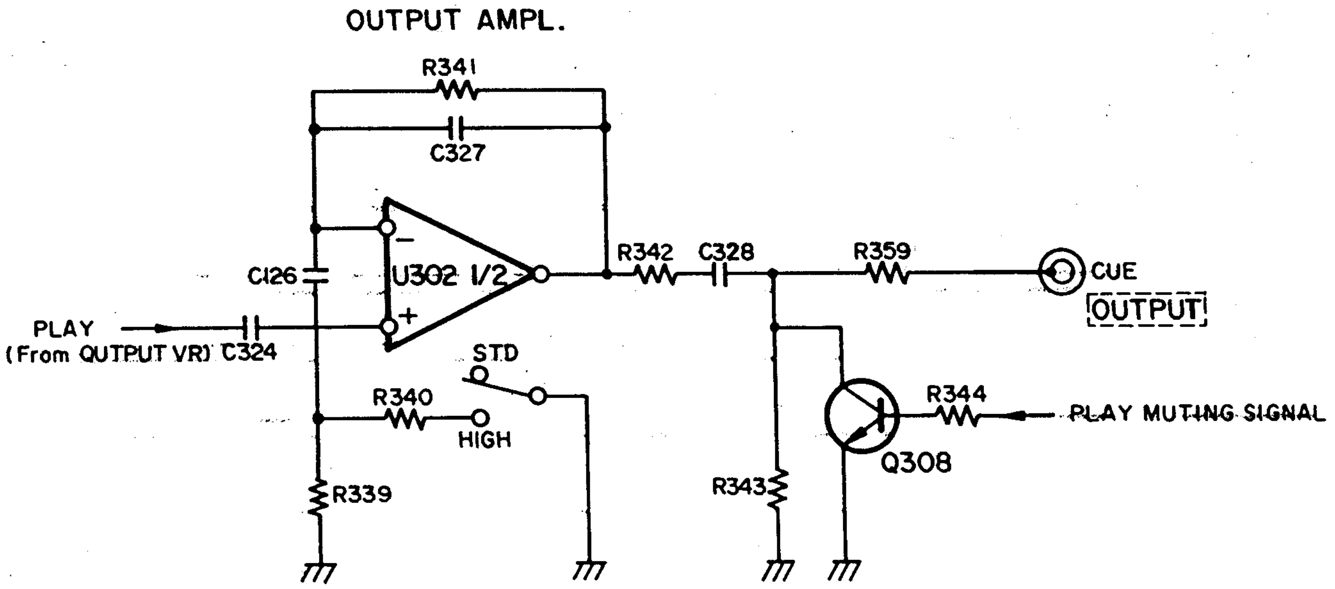

OUTPUT AMPL.
R341
C327
C126
U302 1/2
PLAY
(From OUTPUT VR) C324
STD
R340
HIGH
R339
R342
C328
R359
CUE
OUTPUT
R343
R344
PLAY MUTING SIGNAL
Q308

Fig. 3-25. Cue signal output circuit

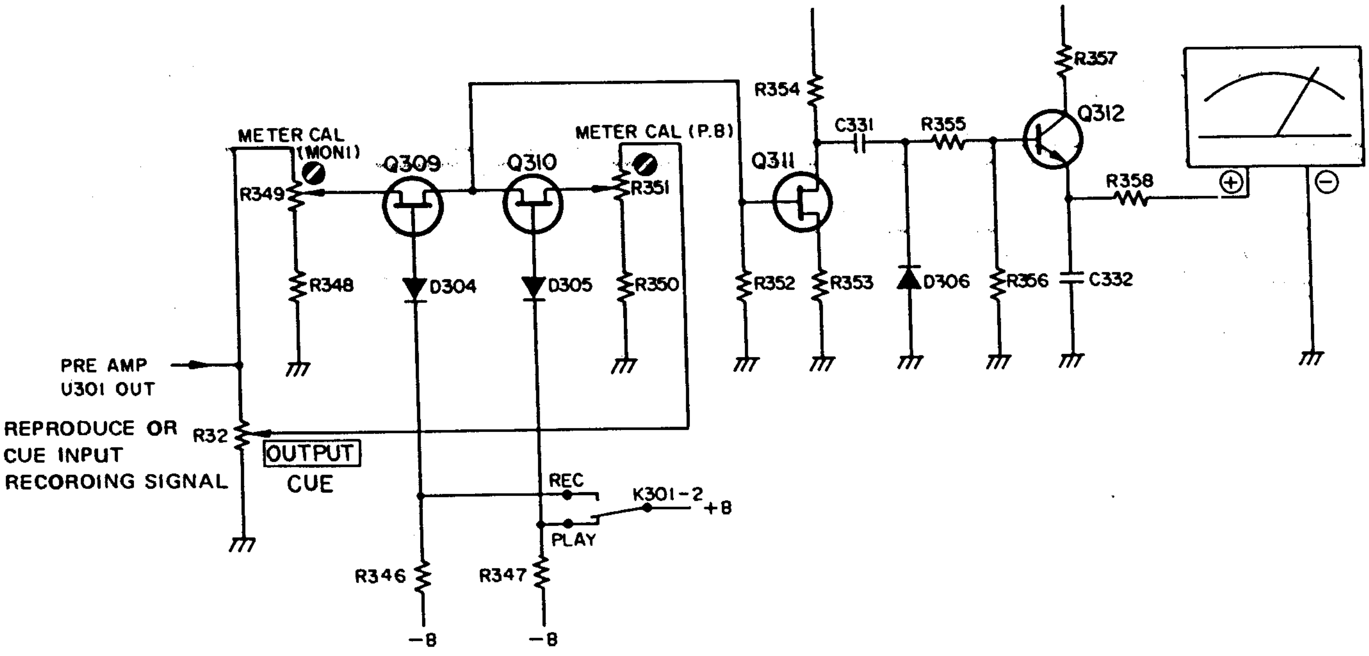

METER CAL (MONI)
R349
Q309
Q310
METER CAL (P.B)
R351
R348
D304
D305
R350
R354
Q311
C331
R355
R357
Q312
R358
R352
R353
D306
R356
C332
PRE AMP
U301 OUT
REPRODUCE OR
CUE INPUT
RECORDING SIGNAL
R32
OUTPUT
CUE
REC
K301-2
+B
PLAY
R346
R347
-B
-B

Fig. 3-26. Peak level meter circuit

b. During playback, relay switch K301-2 keeps FET switch Q310 turned on and Q309 off. Therefore, the signal passes through OUTPUT VR R32, semi-fixed variable resistor R351 (for meter calibration), and FET Q310 and comes to the gate of meter amplifier Q311.

c. Q311 amplifies the signal, then diode D306 rectifies (clamps) it.

d. The rectified signal drives transistor Q312 which drives the meter. The duration of peak level indication may be adjusted by varing the time constant of capacitor C332 and resistor R358.

2) Record peak level meter circuit

a. One component of the recording CUE signal which has been amplified by preamplifier U301 comes to the hot side of OUTPUT VR R32.

b. During recording, relay switch K301-2 keeps FET switch Q309 turned on and Q310 off.

c. Therefore, the recording signal passes through semi-fixed variable resistor R349 (for recording meter calibration) and Q309 and comes to the gate of meter amplifier Q311.

d. From now on, operation is exactly the same as in playback.

3-15. CUE SIGNAL RECORDING CIRCUIT

See Fig. 3-27.

a. During recording, relay K301-2 keeps FET switch Q302 on and Q303 off. Therefore, CUE input signal passes through R31 (CUE INPUT VR), Q302, and C311 and comes to the non-inverted input of the preamplifier. (This preamplifier is used commonly in recording and playback and, therefore, its operation is not described here.)

b. The preamplifier output comes to the semi-fixed resistor which calibrates recording level, then to recording equalizer amplifier via R322 and C316.

c. Frequency response of the recording equalizer amplifier is determined by the variable impedance of the circuit which is connected to the inverting input of the operational amplifier.

d. Namely, when High tape speed is selecte Speed switch S11-1 turns on transistor switch Q306 so that R332 and C322 connect in parallel with R328.

e. When Standard tape speed (STD) is selected, transistor switch Q307 turns on and the equalizer network which is composed of L303, R330, C320, R331, and C321 connects to the equalizer amplifier in the place of R332 and C322.

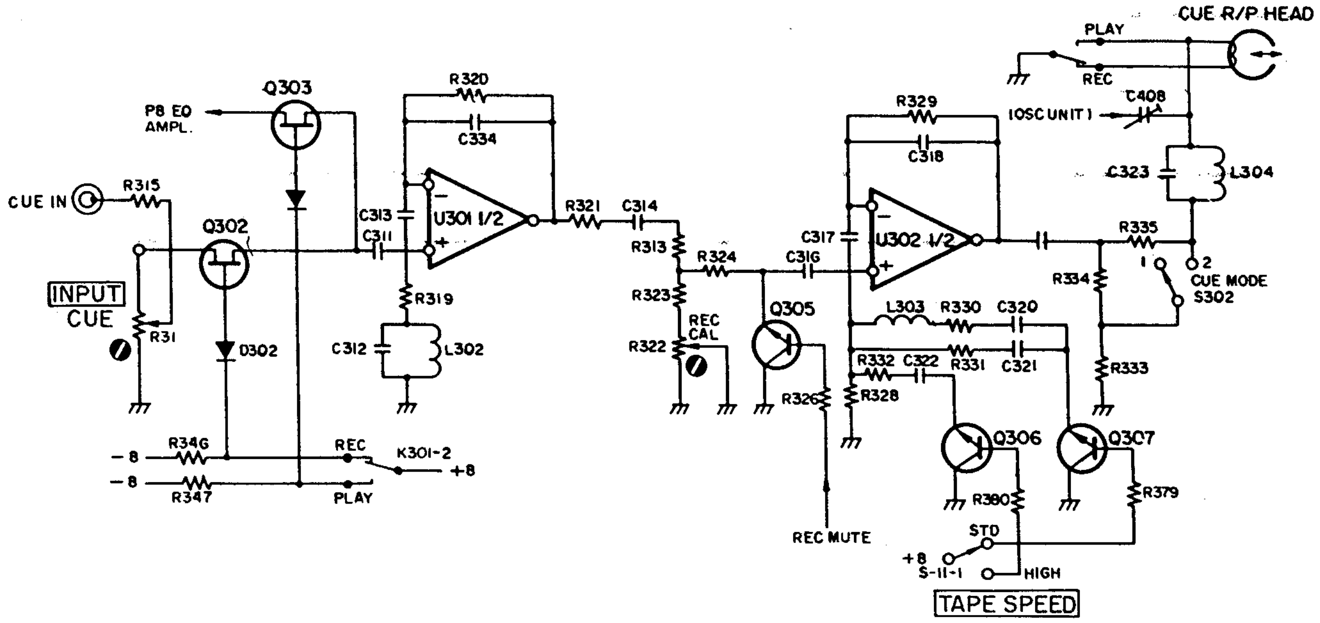

CUE R/P HEAD
PLAY
REC
R320
C334
Q303
P8 EQ AMPL.
R329
(OSC UNIT)
C408
C318
C323
L304
R315
CUE IN
Q302
C313
C311
U301 1/2
R321
C314
R313
R324
C317
C316
U302 1/2
R335
R334
1
2
CUE MODE S302
INPUT CUE
R31
D302
R319
C312
L302
R323
REC CAL
R322
Q305
L303
R330
C320
R332
C322
R331
C321
R333
R326
R328
Q306
Q307
R346
REC
K301-2
-8
-8
+8
R347
PLAY
R380
R379
REC MUTE
STD
+8
S-11-1
HIGH
TAPE SPEED

Fig. 3-27. CUE signal recording circuit

f. Thus equalized and amplified, the recording signal comes to the record head via switch S302 (CUE MODE) and 58-kHz bias trap, and recorded on the tape.

g. Transistor Q305 provides a bypass for muting the recording signal. Namely, it remains on only for 900 msec at the beginning of recording so that switching noises should not be recorded on the tape.

3-16. CUE SIGNAL (25 Hz) GENERATING CIRCUIT

See Fig. 3-28.

In this tape deck, a special signal is used to permit the deck to playback a desired piece of recording repeatedly or to stop the tape at the end of the piece of recording. This signal of approximately 25 Hz will be recorded for about a second in the Cue track of the tape. The circuit which generates this Cue signal is described below.

1) CUE signal generating circuit

See Fig. 3-28.

The 25-Hz CUE signal generating circuit is composed of a switch which gives the command to generate CUE signal, a one-shot multivibrator, transistor switches, and a 25-Hz oscillator.

a. Q410 is the transistor switch which is used to generate CUE signal by remote operation. When H-level comes from the Remote CUE switch, this turns Q410 on and the Q410 performs what switch S12 (CUE PULSE) otherwise does.

b. When one depresses switch S12 (CUE PULSE), the one-shot multivibrator that consists of transistors Q404 and Q403 generates a single pulse, as its name indicates, to keep Q404 on and Q403 off only for the time interval which is determined by parameters R414 and C410 (in this case, approx. 1.05 sec = 0.7 x 150 kohms (R414) x 10 μF (C410)).

c. As a result, Q405 and Q406 turn on for a second, thereby supplying power to the 25-Hz oscillator.

d. The 25-Hz oscillator is a C-R oscillator which combines two operational amplifiers. Its oscillating frequency is given as follows.

$$f = \frac{1}{2\pi\sqrt{R427 \times C418 \times R426 \times C416}}$$

$$\fallingdotseq 25.4 \text{ Hz}$$

Zener diodes D406 and D407 connecting across the input and output of the operational amplifier limit the amplitude of CUE signal.

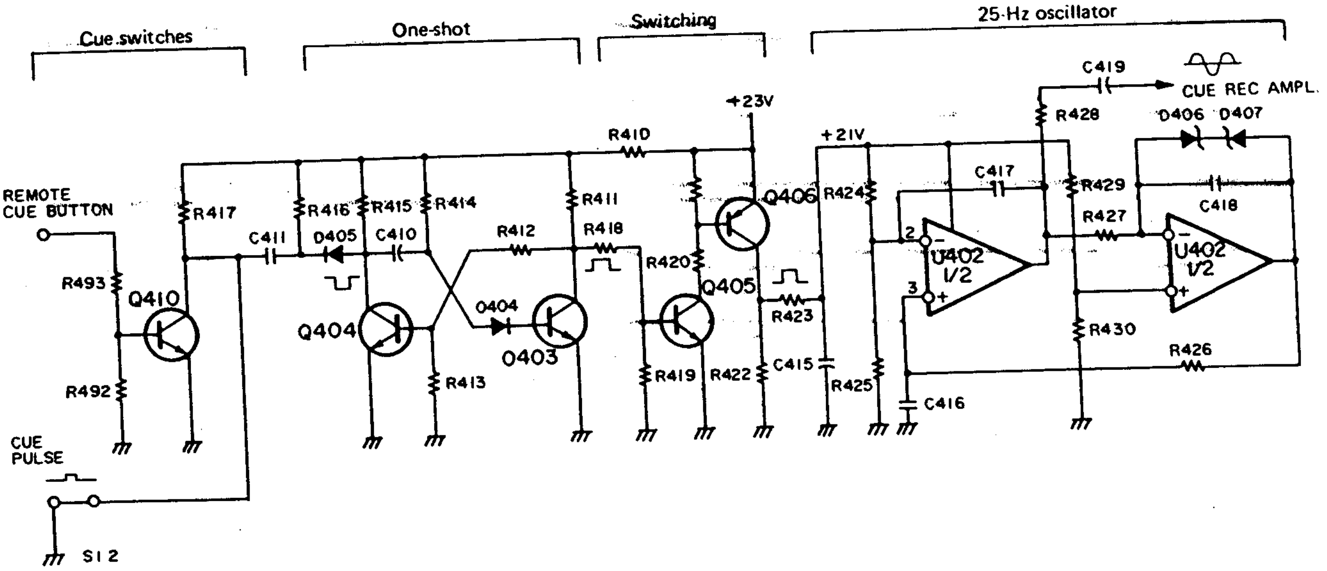

Cue switches
One-shot
Switching
25-Hz oscillator
REMOTE CUE BUTTON
R417
R493
Q410
R492
CUE PULSE
S12
R416
R415
R414
C411
D405
C410
Q404
R413
R412
D404
Q403
R411
R418
R410
+23V
R420
Q405
R419
R422
Q406
R423
C415
+21V
R424
R425
C416
C417
U402 1/2
2
3
C419
CUE REC AMPL.
R428
D406
D407
R429
R427
C418
U402 1/2
R430
R426

Fig. 3-28. CUE signal generating circuit

e. The 25-Hz signal that lasts only for a second enters the CUE signal recording amplifier via R428, C419, FET switch Q302, and C311 and recorded on the CUE signal track of tape.

2) 25-Hz CUE signal reproducing circuit

See Fig. 3-29.

a. The 25-Hz CUE signal picked up by the CUE play head passee through an equalizer amplifier and a preamplifier and comes into a 25-Hz bandpass filter via coupling capacitor C420.

b. The bandpass filter eliminates noise components. Then diodee D408 and D409 full-wave rectify the 25-Hz signal.

c. The rectified output is applied to the base of Q407, thereby turning it on.

d. As Q407 is on, base current flows through Q408, thereby turning it on. As a result, the H-level CUE signal develops at the collector of Q408. The H-level output falls to L-level in one second because the input CUE signal lasts only for a second.

e. The CUE output signal of Q408 is also applied to the base if switching transistor Q409 for remote CUE signal, thereby turning it on.

3-17. AUTO-PRESENT OPERATION

The Auto-Present system performs such operations as stopping the tape when the piece of music currently played back comes to the end or repeating playback all automatically. This system permits selection of one out of six modes with two switches.

1) CUE switch

- If this is set at STOP, the tape will automatically stop when a 25-Hz CUE mark recorded on the CUE signal track of tape during record mode has been encountered.
- If it is set at OFF, the tape does not stop even when a CUE mark has been detected.
- If the REW position is selected, the tape will stop for a moment when a CUE mark has been found, then it will be rewound from the marked position all automatically. It is the REW switch described next that determines the mode in which the deck will operate after the tape has been rewound in the step described above.

2) REW switch

- COUNTER STOP: Stops the tape just when the counter reads zero.
- COUNTER PLAY: Causes tape travel to halt when the counter reads zero, then resumes playback.

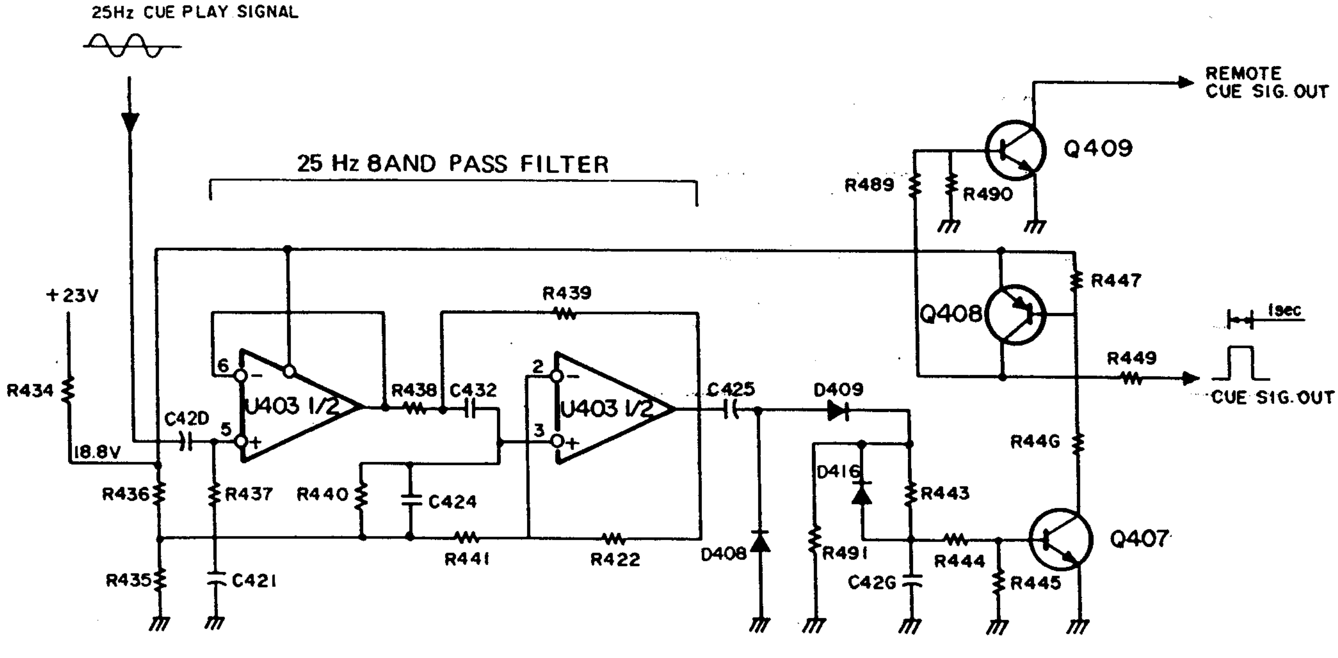

25Hz CUE PLAY SIGNAL
25 Hz BAND PASS FILTER
REMOTE CUE SIG. OUT
Q409
R489
R490
+23V
R447
R439
Q408
1sec
R449
CUE SIG. OUT
R434
6
2
R438
C432
C425
D409
U403 1/2
U403 1/2
C420
5
3
18.8V
R446
D416
R443
R436
R437
R440
C424
Q407
R441
R422
D408
R491
R444
R435
C421
C426
R445

Fig. 3-29. 25-Hz CUE signal reproducing circuit

* BOT STOP: Stops the tape when it has been rewound to the beginning of tape (BOT).
* BOT PLAY: Causes tape travel to halt when the tape has been rewound to BOT, then resumes playback.

By using these functions, you may, for example, playback that portion of a tape which is bounded by a CUE mark and the point where the tape counter reads zero as many times as desired automatically. For this purpose, set the CUE switch at REW and the REW switch at COUNTER PLAY. If you set the REW switch at BOT PLAY, that portion of the tape which begins at the beginning end and ends at the point marked with a CUE signal may be automatically played back repeatedly.
These functions are described below.

A. We assume that we are going to playback a tape which contains pieces of recording, named A, B, and C respectively; a CUE mark is recorded at the end of piece B; and counter is set in such a manner that it reads zero at the beginning of piece B.

B. When the CUE switch is set at STOP:

a. When the CUE play head picks up a 25-Hz CUE mark at the end of piece B, the CUE signal reproducing circuit amplifies and rectifies the signal into a positive pulse (CUE SIG OUT) of 1 second wide.

b. The pulse enters pin 9 (D7) of multiplexer U911, telling the presence of a CUE mark. On the other hand, H-level is coming into pin 1 (D0) of U911 since the CUE switch (S991) is set at STOP.

c. These two signal serve as the data of the control program which causes U911 to deliver a stop command to the controller.

d. Receiving the stop command, the controller generates a signal that actually stops tape travel.

e. If the CUE switch is set at REW, pin 2 (D1) and pin 9 (D7) of U911 are at H-level. In this case, U911 sends a rewind command to the controller.

f. The controller then generates a signal that causes the deck to rewind the tape. When the tape has been rewound to the point where the tape counter reads zero, counter driver IC U406 outputs a pulse (H-level) at pin 17 (OUT) to stop tape travel (refer to the description of the tape counter circuit).

g. The pulse enters pin 22 (AI) of the controller.

h. On the other hand, if the AUTO PRESENT (REW) switch is set at COUNTER PLAY, H-level comes to pin 5 (D4) of multiplexer IC U911.

i. The two signals – one entering pin 22 and the other pin 5 – causes the controller to generate a signal that commands the deck to stop rewinding tape at the counter's zero point, then a signal that commands resumption of playback. Thus playing back will be repeated.

j. If the REW switch is set at COUNTER STOP, pin 4 (D3) of U911 is at H-level. In this case, the controller will receive a stop command and the tape stop at the counter's zero point.

k. If the REW switch is set at BOT PLAY, the Counter Zero signal which the counter generates at its zero point during rewinding and enter pin 22 (A1) of the controller will be disregarded and rewinding continued because the REW switch is set at neither COUNTER PLAY nor COUNTER STOP.

l. When the tape has been rewound to its beginning end, the outputs of the photocouplers (refer to the description of the tape counter circuit) disappear and a NAND gate of the counter circuit outputs an H-level signal.

m. This H-level enters pin 25 (INT) of the controller.

n. On the other hand, pin 6 (D5) of multiplexer IC U911 is at H-level because of the REW switch setting (BOT PLAY).

o. From the two H-level signals described in step m and n, the command of BOT PLAY will be decoded and the controller causes the deck to stop the tape at its beginning end then to resume playback.

p. Similarly, when the REW switch selects BOT STOP, the combination of that data which enter multiplexer U911 and pin 25 (INT) of the controller causes the program to execute to stop the tape at its beginning end.

4. ESSENTIAL MAINTENANCE EQUIPMENT/MATERIAL

Spring scale:	For pinch roller pressure check, 0 to 1 kg (2.2 lbs)
Cassette torque meter:	For torque check, 0 to 100 g-cm (0 to 1.4 oz-inch), 0 to 160 g-cm (0 to 2.2 oz-inch)
Wow & flutter meter:	Meguro Dempa Sokki Model MK-668B or equivalent
Audio oscillator:	Hewlett Packard Model 204C or equivalent
Frequency counter:	Range: 0 to 1 MHz, Sensitivity: 0.1 V RMS, Impedance: More than 1 MΩ, less than 25 pF
Level meter:	Range: -80 to +40 dB Impedance: More than 1 MΩ, less than 25 pF
Band pess filter:	1 kHz narrow hand pass type
Distortion meter:	Basic frequency 400 Hz, 1 kHz
Oscilloscope:	Ordinary type
Attenuator:	Ordinary type
Test load resistor:	Noninductive type 8 ohm/1 W
Head demagnetizer:	TEAC E-3
Bulk tape eraser:	TEAC E-2A or equivalent
Cleaner:	TEAC recorder cleaner kit or pure alcohol
Oil:	TEAC oil kit or equivalent
Test tapes:	
TEAC MTT-111, MXT-111:	Wow & flutter or tape speed test tape, 3000 Hz/-10 dB
TEAC MTT-150	Dolby level calibration test tape, Dolby B-type tone (400 Hz), 200 nWb/m
TEAC MTT-356	Head azimuth/frequency characteristic test tape for EQ Co (CrO_2), 3180 μs + 70 μs
TEAC MTT-5061 or equivalent:	Blank test tape for BIAS/EQ Co (CrO_2)

NOTES:
1. All resistors are 1/4 watt, 5 %, unless marked otherwise. Resistor values are in ohms (k = 1,000 ohms, M = 1,000,000 ohms).
2. All capacitor values are in microfarads (p = picofarads).
3. Parts marked with ⚠ are safety critical components.
   They must always be replaced with components specified by TEAC.
4. 0 dB is referenced to 1 V in this manual unless otherwise specified.
5. PC boards shown viewed from foil side.
6. Service data are found where they are necessary.
   Improvements may result in service data changes without notice.

5. CHECK AND ADJUSTMENT OF THE MECHANISM

5-1. HEAD BASE PLATE POSITIONING

1) Set the deck in the PLAY mode.
2) Push the head base plate by hand in the direction of the arrow and check that the head base plate and the stopper portion of the mechanism chassis make contact.
3) If there is any clearance, loosen the two screws on the head base plate solenoid and reposition the solenoid until the clearance is eliminated.

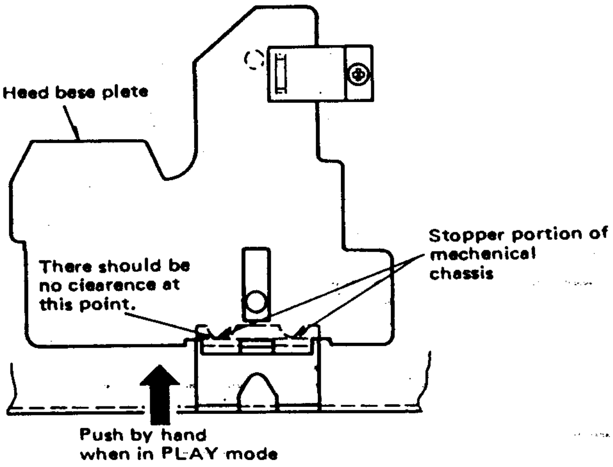

Head base plate
There should be no clearance at this point.
Stopper portion of mechanical chassis
Push by hand when in PLAY mode

Fig. 5-1.

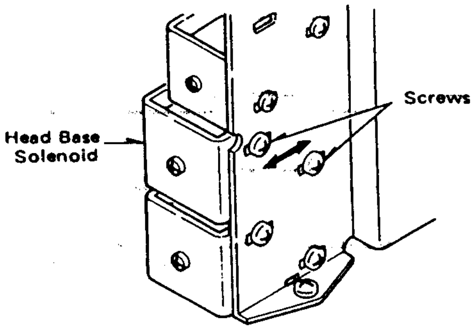

Head Base Solenoid
Screws

Fig. 5-2. Head base solenoid location

5-2. MICROSWITCH (A) ASSEMBLY CLEARANCE

1) Insert a blank cassette and close the cassette holder.
2) Loosen the two screws on the microswitch (A).
3) Move the switch so that actuator of the switch contacts the safety lever.
4) Adjust the switch position to obtain a clearance of between 0.1 mm to 0.3 mm.
5) Retighten the screws.

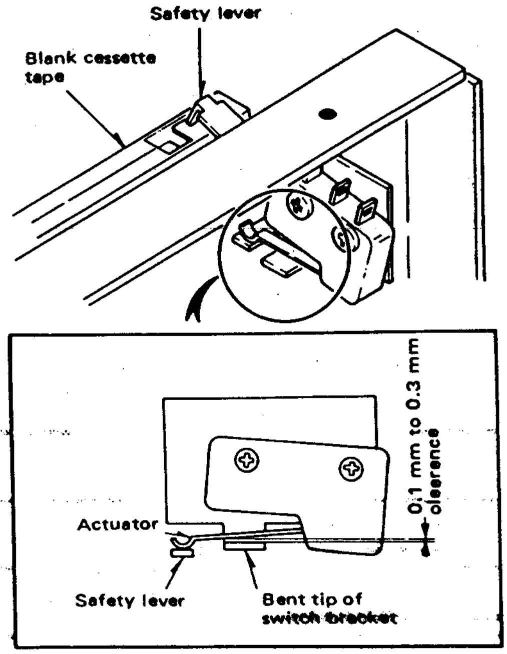

Safety lever
Blank cassette tape
0.1 mm to 0.3 mm clearance
Actuator
Safety lever
Bent tip of switch bracket

Fig. 5-3

5-3. MICROSWITCH (B) ASSEMBLY CLEARANCE

1) Push the EJECT button to open the cassette holder.
2) Loosen the two screws on the microswitch (B).
3) Move the switch so that switch actuator contacts the bent projecting portion of the eject lever.
4) Adjust the switch position to obtain a clearance of approximately 1 mm.
5) Retighten the screws.

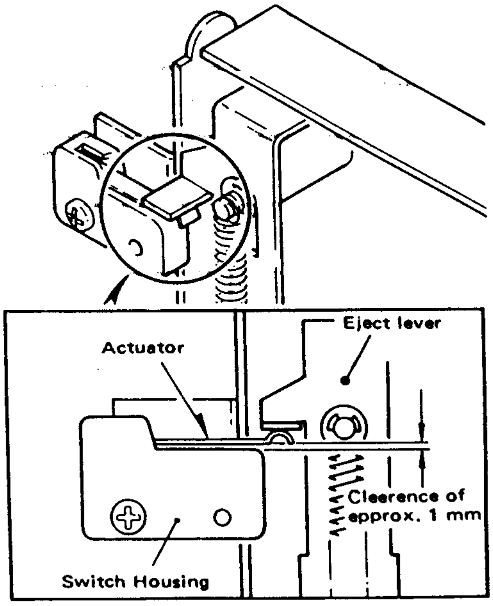

Actuator
Eject lever
Clearance of approx. 1 mm
Switch Housing

Fig. 5-4

5-4. CAPSTAN ASSEMBLY THRUST

1) Turn the thrust adjusting screw so that thrust of the capstan shaft is within 0.05 mm to 0.15 mm.

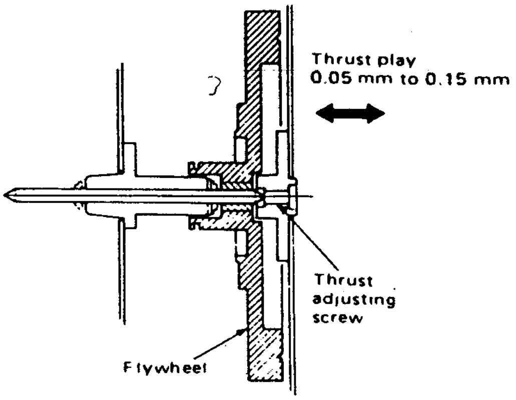


Fig. 5-5

5-5. TAKEUP TORQUE

Takeup torque adjustment is critical to stabilize tape travel and reduce variations in tape speed.

1) Load a cassette torque meter (0 to 100 g-cm, 1.4 oz-inch) in the cassette holder.
2) Measure the torque by running the tape of the meter in the reproduce mode. The meter reading should be 45 –65 g-cm (0.6–0.9 oz-inch).
3) If the reading is outside this range, clean the surface of the idler pulley in the reel table assembly which comes into contact with the tape using cleaning liquid. Also check the operation of the moving parts of the reel table assembly.
4) If the reading is still unsatisfactory, replace the reel table ass'y.

5-6. FAST FORWARD AND REWIND TORQUE

1) Load a cassette torque meter (0 to 160 g-cm, 22 oz-inch).
2) With the deck in the fast forward and rewind modes, read the meter. If the meter is provided with tape, note the readings with the tape fully wound on the reel taking up the tape in each mode so that the measurement is not influenced by the tape's inertia. The fast forward torque must be in the range 90 – 160 g-cm (1.3 – 2.2 oz-inch) and the rewind torque must be in the range 90 – 160 g-cm (1.3 – 2.2 oz-inch).
3) If the readings are outside these ranges, clean the surface of the idler pulley with cleaning liquid and check the operation of the moving parts of the reel table ass'y.

5-7. PINCH ROLLER PRESSURE

Pinch roller pressure must also be adjusted to the correct value to stabilize tape travel and reduce variation in tape speed.

1) Remove the cessette door cover te install the spring scale.
2) With the deck in the reproduce mode, attach the scale near the shaft of the pinch roller, being careful not to touch the pinch roller. See Fig. 6-6.
3) Move the scale gradually in the direction of the arrow until the capstan shaft and pinch roller are completely separated.
4) Gradually return the pinch roller and note the reading on the scale when the pinch roller touches the capstan and starts rotating. The reading should be between 390 and 490 g (13.8 and 17.3 oz).
5) If the reading is outside this range, replace the pinch roller pressure spring or adjust the pressure by bending the spring as shown in Fig. 5-6.

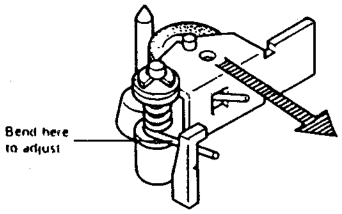


Fig. 5-6

5-8. TAPE SPEED

To check tape speed, use test tapes MTT-111 (1-7/8 ips) and MXT-111 (3-3/4 ips) on which a 3-kHz signal is recorded with high accuracy or their equivalents.

1) Connect a frequency counter to the OUTPUT terminals as shown in Fig. 5-8.
2) Play the test tape from the start of the tape and check that the frequency counter reading is within 3 kHz ±0.5 %
3) If the reading is outside this range, clean the tape path and check the pinch roller pressure and takeup tension.
4) If these values are correct, adjust the resistor of the motor so that the reading is within the range 3000 Hz ±5 Hz.

NOTE: Adjust tape speed after the tape has run for about 30 sec in the reproduce mode.

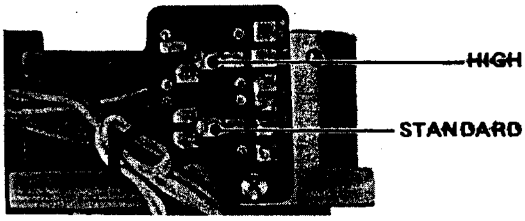


Fig. 5-7

5-9. WOW AND FLUTTER

Before measuring wow and flutter, the following points should be read carefully. It is necessary to decide which of the two measurement methods should be used.

1) Reproduce method: Measure while playing wow & flutter test tape MTT-111, MXT-111 or its equivalent.
   Record/reproduce method: Record a 3-kHz signal on blank tape, rewind the tape and reproduce the recorded signal.

NOTE: When measuring using the record/reproduce method, the recorded section should be reproduced repeatedly to obtain the mean value. Be careful not to read the meter for those parts of the tape in which wow & flutter components in recording and reproducing cancel each other.

2) Set the flutter meter controls to the required standard. Select the DIN/IEC/ANSI peak value or the NAB RMS value, then set the weighting control as required.
3) Measure at the beginning and the end of the tape. The measured value will differ slightly according to the measuring method and instrument used. Standard values are:

1-7/8 ips:

±0.085 % peak	(DIN/IEC/ANSI weighted)
±0.18 % peak	(DIN/IEC/ANSI unweighted)
0.06 %	(NAB weighted)
0.11 %	(NAB unweighted)

3-3/4 ips:

±0.055 % peak	(DIN/IEC/ANSI weighted)
±0.13 % peak	(DIN/IEC/ANSI unweighted)
0.04 %	(NAB weighted)
0.07 %	(NAB unweighted)

NOTE: Measure after cleaning the tape path, especially the capstan shaft, pinch roller and head surfaces.

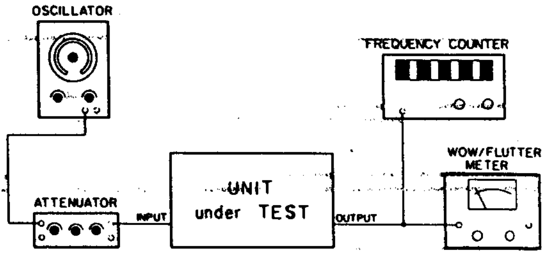
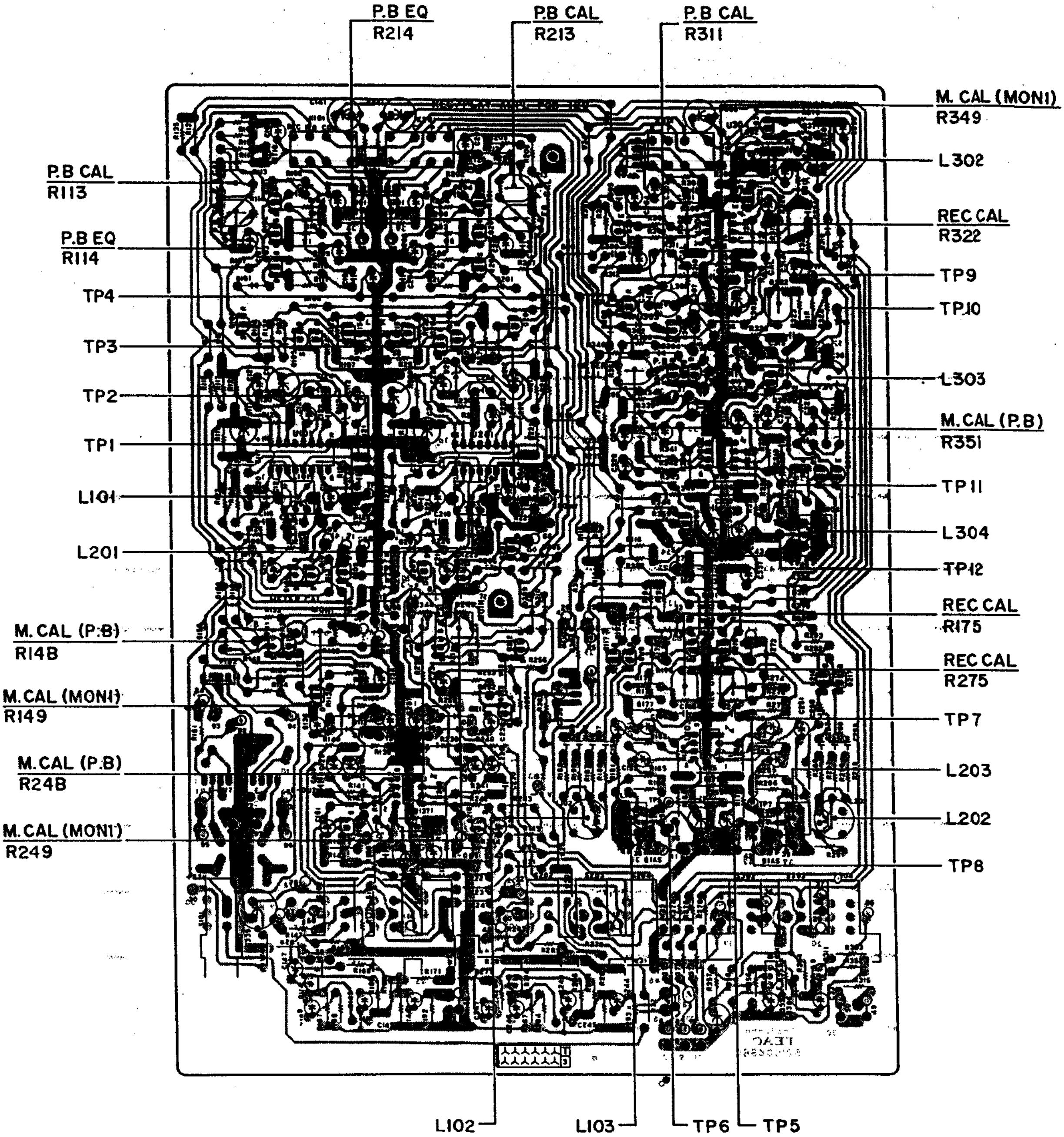


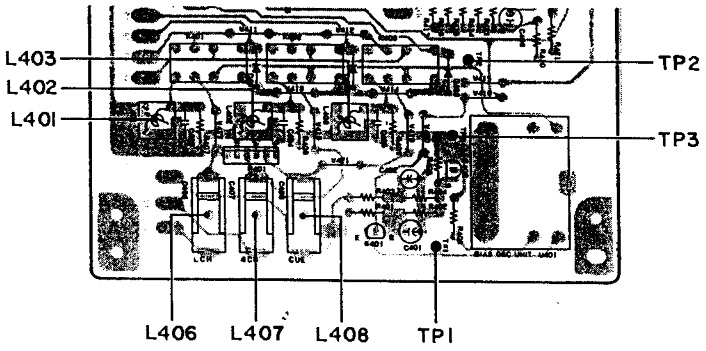
Fig. 5-8

6. CHECK AND ADJUSTMENT OF THE RECORD/PLAY AMPLIFIER

REC/PLAY AMPL. PCB ASSY


P.B EQ
R214
P.B CAL
R213
P.B CAL
R311
M. CAL (MONI)
R349
L302
REC CAL
R322
TP9
TP10
L303
M.CAL (P.B)
R351
TP11
L304
TP12
REC CAL
R175
REC CAL
R275
TP7
L203
L202
TP8
P.B CAL
R113
P.B EQ
R114
TP4
TP3
TP2
TP1
L101
L201
M.CAL (P.B)
R148
M.CAL (MONI)
R149
M.CAL (P.B)
R248
M.CAL (MONI)
R249
L102
L103
TP6
TP5

OSC PCB 107 ASSY


L403
L402
L401
TP2
TP3
L406
L407
L408
TP1

Remove the top cover by unscrewing the screws securing it. When the top cover is removed, the record/reproduce amplifier PCB ASSY can be seen beneath the OSC PCB ASSY. When adjusting the azimuth of the record/reproduce head, remove the cassette holder door cover.

The following points should be observed before starting the record/reproduce amplifier checks or adjustments.

* Before adjusting the amplifier, the erase head, record/reproduce head and tape path should be demagnetized and cleaned with cleaning fluid.
* Adjust the left channel first, then the right channel. In the circuit diagrams, 100-series numbers refer to left channel components, 200-series numbers refer to right channel components and 300-series numbers refer to CUE channel. For example, R180 is a left channel resistor while R280 is the equivalent right channel resistor.
* 0 dBV = 1 V
* Unless otherwise specified, set the switches as follows:

Switches	Positions
DOLBY NR	OUT
SPEED	STD
INPUT	LINE
FUNCTION	REC for recording, NORMAL for playback
OUTPUT	NORMAL

* If characteristics such as frequency response and crosstalk are found to be unsatisfactory, it is necessary to check and adjust the azimuth of the record/reproduce head first prior to performing amplifier adjustment.

Check and adjustment of the record/reproduce head

Connect an oscilloscope and an AC voltmeter to terminal OUTPUT (see Fig. 6-1). Playing back Test Tape MTT-356, check that the phase difference between L- and R-channels is within 90°. Next, playing back 12.5 kHz of the same test tape, move the azimuth adjusting nut to attain maximum level in both the L- and R-channels. Check that the output level of the CUE signal is also nearly at maximum at this time.

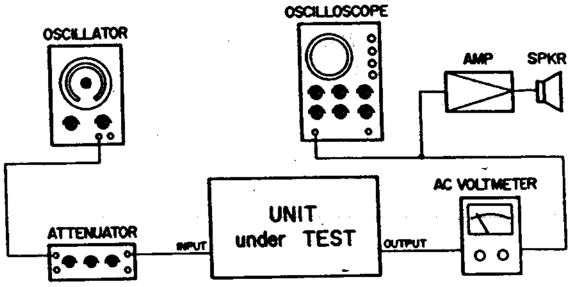


Fig. 6-1

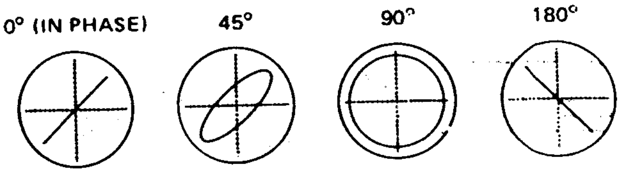


Fig. 6-2

6-1. PLAYBACK LEVEL

1) Playback Test Tape MTT-150.
2) Connect the Hot line of a level meter to DOLBY TP (TP1/TP3) and its Cold line to GND TP (TP2/TP4) (TP9/TP10 for CUE channel). Check that the level meter reads -4.7 dBV (580 mV).
3) If the requirement is not met, make adjustment with semi-fixed variable resistors R113, R213, and R311.
4) Connect a level meter to terminals OUTPUT. Check that the level meter reads -1 dBV (891 mV) ±1 dB when the OUTPUT control is set at its maximum position.
5) Adjust the OUTPUT level control so that the OUTPUT level is indicated as -7 dBV (447 mV). At this time, also confirm that the +4 dBm BAL OUTPUT terminal level is +7 dBm ±1 dB.
6) Set the HIGH/NORMAL switch at HIGH in this condition, and check that the output level rises 10 dB ±1 dB. Then reset the switch at NORMAL.

6-2. VU METER READING

1) Playback Test Tape MTT-150.
2) Check that the VU meter reads +3 ±1 VU and the CUE meter 0 dB.
3) If the readings are wrong, make adjustment with semi-fixed variable resistors R148 and R248 for the VU meters and with R351 for the CUE meter.

6-3. PLAYBACK FREQUENCY RESPONSE

1) Connect a level meter to terminals OUTPUT (except for the CUE track).
2) Playback Test Tape MTT-356 and check that the output level stays within the specified boundaries (see Fig. 6-3) over the entire frequency range.
3) If the requirement is not met, move semi-fixed variable resistors R114 and R214 to attain the seme level at 315 Hz and 6.3 kHz. If the frequency response is still wrong, check the head, tape travel, etc. and adjust head azimuth again.

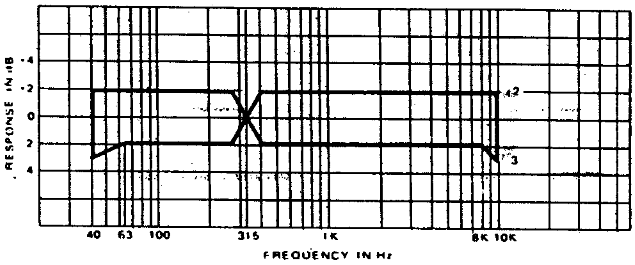


Fig. 6-3. Playback frequency response

6-4. BIAS DUMMY COIL ADJUSTMENT

1) Connect a frequency counter to test point TP2 at bias oscillator U401.
2) Load the deck with a blank test tape. Set all FUNCTION REC/MORMAL switches at REC and select REC/PAUSE mode with operating buttons.
3) Check bias frequency (*fo*).

NOTE: The *fo* is a bias frequency value determined when all the FUNCTION switches of every channels (L, R, and CUE) are set at REC, with the dummy coil in a non-operating state.

4) Resetting L-channel (S103) alone to NORMAL, adjust L401 until the bias frequency becomes *fo*.
5) Resetting R-channel (S203) alone to NORMAL, adjust L402 until the bias frequency becomes *fo*.
6) Resetting CUE channel (S303) alone to NORMAL, adjust L403 until the bias frequency becomes *fo*.
7) Check that the bias frequency stays within ±506 Hz of *fo* at any combination of settings of the REC/NORMAL switches (S103, S203, and S303).

6-5. BIAS FILTER ADJUSTMENT

1) Connect a level meter to terminals OUTPUT (L/R/CUE).
2) Load the deck with a blank test tape. Set all REC/NORMAL switches at REC and select REC/PAUSE mode with operating buttons.
3) Adjust L101, L201, L302, L501, and L502 to minimize the level of the bias signal leaking out to the output terminals.

NOTE: INPUT control should be set at MIN.

6-6. MONITOR METER ADJUSTMENT

1) Connect a level meter to terminals OUTPUT (L/R/CUE).
2) Load the deck with a blank test tape. Set all channels in REC/PAUSE mode. Apply 400 Hz, –11 dBV (282 mV) to terminals LINE.
3) Connect a level meter to terminal DOLBY TP1, 3 (TP9 for the CUE channel) and adjust the INPUT control (R117/R217/R317) of each channel so that the level becomes –4.7 dB (580 mV).
4) Adjust the OUTPUT control of each channel so that the output level becomes –7 dBV (447 mV). Also confirm that, when a +4 dBm 400 Hz signal is applied to the +4 dBm BAL INPUT terminal, the OUTPUT terminal level is –10 dBV ±1 dB and the +4 dBm BAL OUTPUT terminal level is +4 dBm ±1 dB.
5) Adjust semi-fixed variable resistor R149/R249 so that the meter of the L/R-channel read +3 VU, and semi-fixed variable resistor R349 so that the CUE meter reads 0 dB.

6-7. BIAS TRAP ADJUSTMENT

1) Load the deck with a blank test tape. Set all REC/NORMAL switches at REC. Select REC/PAUSE mode with operating buttons.
2) Connect a level meter to test point TP5/TP7/TP11 of each bias trap, adjust L103/L2 L304 so that the meter reading becomes minimum.

6-B. BIAS ADJUSTMENT

Make the following preparation for adjusting bias.

a. Connect measuring instruments as shown in Figure 6-1.
b. Load the deck with Test Tape MTT5061 and put it in REC/PAUSE mode.
c. Set the REC/NORMAL switch of every channel at REC.
d. Apply 400 Hz, –11 dB (282 mV) to input terminals L, R, and CUE.
e. Set the OUTPUT control of every channel at its maximum position.

f. Turn the INPUT control of each channel so that its output level becomes –1 dBV (891 mV). At this point, the Dolby level setting has been reached.

g. Turn the OUTPUT control of each channel so that its output level becomes –7 dBV (447 mV). Now preparation is complete. Make adjustment by the following procedures.
   1) Reduce the input level by 33 dB (into –44 dB, 6.3 mV), and record and reproduce 400 Hz and 10 kHz alternately.
   2) Check that the signal level at terminals OUTPUT remains almost unchanged at both frequencies.
   3) If the output level varies, edjust C406, C407, and C408. Then repeat the above steps until an optimum condition is met.

6-9. RECORDING LEVEL

Perform steps a–g described in Section 6-8. (This condition is Dolby level).

1) Set the attenuator at –14 dBV (200 mV) which is 3 dB below the input level of –10 d8V (0.3V)
2) Record 400 Hz on a blank test tape (MTT-5061). Playing it back, adjust semi-fixed variable resistors R175/R275, and R322 so that the output level becomes –10 dBV (0.3 V).

6-10. OVERALL FREQUENCY RESPONSE

Set up the tape deck through the steps of a through g described in Section 6-8, Bias adjustment.

1) Reduce the input level to –44 dBV (6.3 mV). Record input signals of varying frequencies on the blank test tape MTT-5061. Reproducing the signals, check if the requirements given in the table of Figure 6-5 are met. Carry out the same check at High tape speed.
   If the overall frequency response is poor, check the record/reproduce head if it is clean and not defective. Check the bias level, too.

NOTE: Keep the NR SYSTEM switch at OUT.

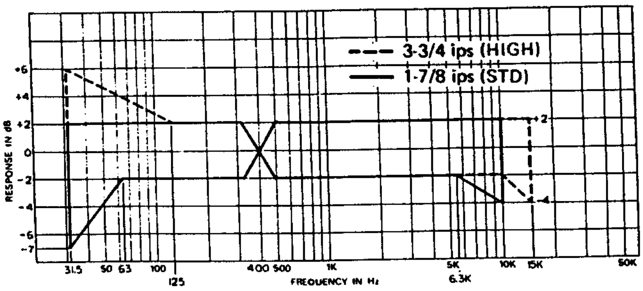


Fig. 6-4 Record/playback frequency response

6-11. OVERALL S/N

Set up the tape deck through the steps of a through g described in Section 6-8, Bias adjustment.

1) Record 400 Hz, –11 dBV (DOLBY level setting) on a blank tape. Then cut off input signal and record null signal.
2) Rewind the tape to the beginning of record.
3) Playback the recorded section and measure the output level of the section with the signal, then, at the point where the signal stops, increase the sensitivity of the VTVM and measure the output level of the no-signal section. The output level measurement should be weighted.
4) Calculate the level ratio of noise with respect to the recorded signal and confirm that they are identical to the values shown in the table below.

If the values are unsatisfactory, proceed as follows:

* Demagnetize and clean the erase and record/reproduce heads.
* Check that erasing is being done effectively.
* Check and adjust reproduce and record/reproduce frequency response.
* Check and adjust the bias trap.
* Replace the tape.

TRACK \ SPEED	STANDARD	HIGH
L & R	More than 49 dB	More than 49 dB
CUE	More than 43 dB	More than 43 dB

6-12. OVERALL DISTORTION

1) Connect measuring instruments as shown in Figure 6-5.
2) Set up the tape deck through the steps of a through g described in Section 6-8, Bias adjustment.

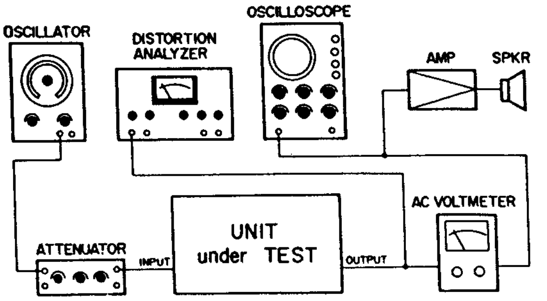
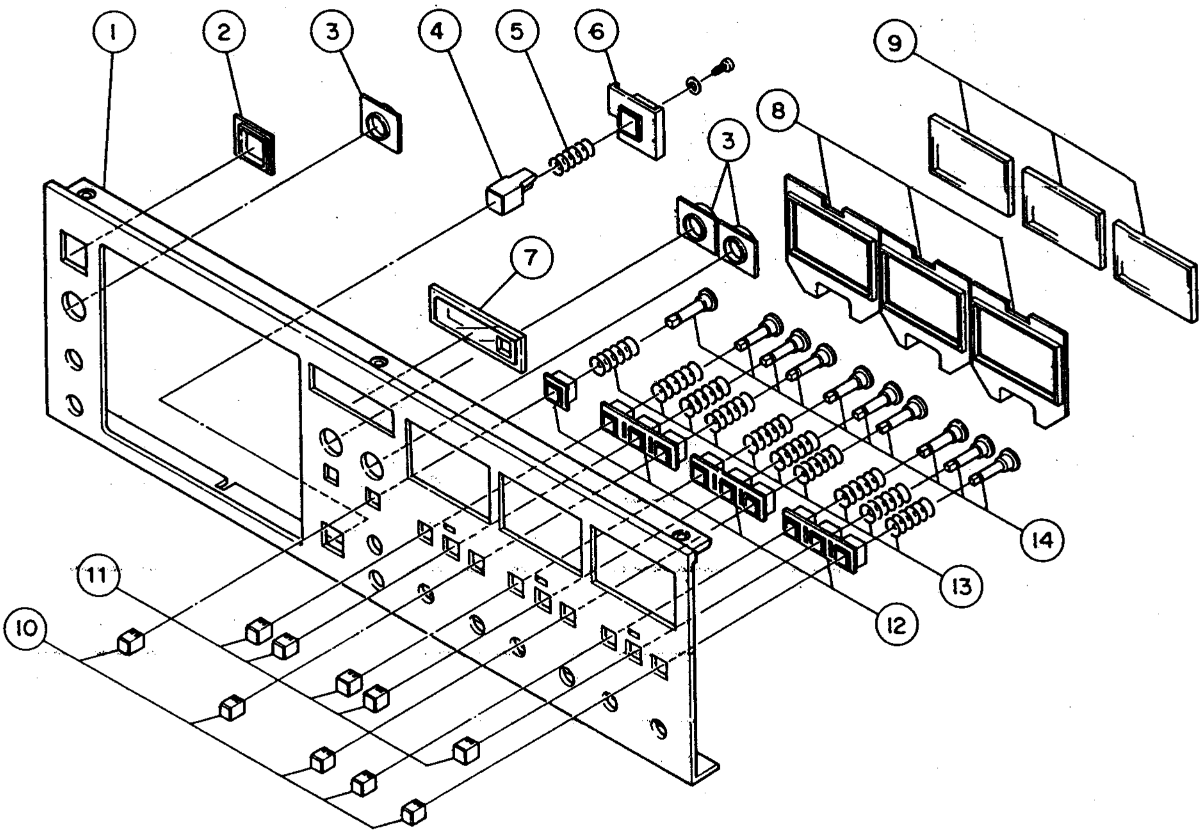


Fig. 5-5

EXPLODED VIEW-2



EXPLODED VIEW-2

REF. ND.	PARTS NO.	DESCRIPTION	COMMON MODELS	REMARKS
2 - 1	*580017B403	Panel, Front	133	
2 - 2	*5800173000	Escutcheon, Power Switch	133	
2 - 3	*5800173200	Escutcheon, Switch	133	
2 - 4	5800177200	Button, Eject	133	
2 - 5	5800178300	Spring, Eject	133	
2 - 6	*5800177700	Escutcheon, Eject Button	133	
2 - 7	*5800172501	Window, Cassette	133	
2 - 8	*5800177101	Escutcheon, Meter	133	
2 - 9	*5800177000	Window, Meter	133	
2 - 10	5B00177400	Button, Push; (A)	133	
2 - 11	5B00177500	Button, Push; (B)	133	
2 - 12	*5800177600	Escutcheon, Push Button	133	
2 - 13	5B00142601	Spring, C	T-9	
2 - 14	5B00092502	Rod, A	A-7	

Parts marked with *reqoire longer delivery time.

3) Reduce the input level by 3 dB and record 400 Hz, –14 dBV (200 mV). Then reproduce it and check distortion of the output signal at terminals OUTPUT.

4) Distortion should not exceed 1.5 % at the audio channels (L and R) and 2.0 % at the CUE channel. Use the MTT-5061 tape for this measurement.
If the requirements are not met, check the bias level, then S/N and overall frequency, too.

6-13. ERASING EFFECT

1) Connect measuring instruments as shown in Figure 6-6. Use a 1 kHz bandpass filter to check erasing effect.
2) Set up the tape deck through the steps of a through g described in Section 6-8, Bias adjustment.
3) Raising the input level by 10 dB, record 1 kHz (saturation level)/–1 dBV (891 mV) on Test Tape MTT-5061.
Reducing the level meter's sensitivity by about 10 dB, playback the tape and measure the level at terminals OUTPUT.
4) Rewind the tape to the start of the recording. Erase the recorded section with no input signal.
5) Playback the erased section and measure the output level, increasing the sensitivity of the VTVM.
6) Calculate the ratio of the signal output level to the output level obtained by playing the erased tape.
7) The value should be more than 65 dB for any of the tapes to be used.
If the erase effect is unsatisfactory, check whether the erase head is clean and the tape is running correctly.

NOTE: When checking erasure, make sure the blank tape used has been erased by a bulk eraser before using it. Correctly tune the frequency of the signal to be recorded to match the bandpass filter and compensate for measuring instrument loss.

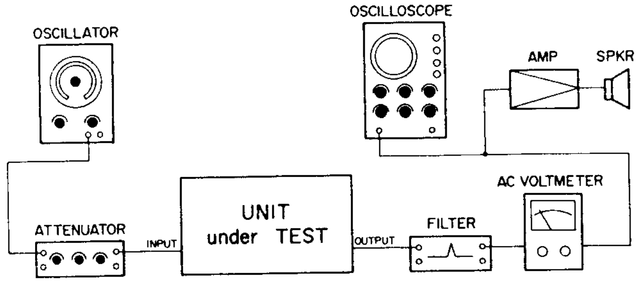


Fig. 6-6

6-14. CHANNEL SEPARATION

1) Connect measuring instruments as shown in Figure 6-6 (connect a level meter alone to the R-channel and, only for the L-channel, a 1-kHz bandpass filter between terminals OUTPUT and the level meter).
2) Set up the tape deck through the steps of a through g described in Section 6-8.
3) Make a stereo recording applying the input signal only to the left channel and no signal to the right channel.
4) Rewind the tape to the start of the recording and play it.
Measure the output levels of both channels. (The right channel will contain the recorded signal and the left channel will contain components which have leaked from the right channel.).
5) Calculate the difference in level between the two channels. This value should be more than 45 dB.

6-15. DOLBY NOISE REDUCTION EFFECT

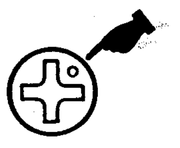
1) Connect measuring instruments as shown in Figure 6-1.
2) Set up the tape deck through the steps of a through g described in Section 6-8.
3) Apply a input signal of 1 kHz and –31 dBV (28.2 mV) which is 20 dB below the Dolby level to the LINE input. Setting the DOLBY NR switch at OUT, record the signal. Next, reproducing the signal, check that level variation stays in 5.5 ± 2.2 dB when the DOLBY NR switch is moved over IN and OUT.
4) With the DOLBY NR switch set at OUT, record a 10 kHz signal of the Dolby level minus 30 dB (–41 dB = 8.9 mV). Then reproduce the signal and check that level variation stays in 10 ± 2 dB when the DOLBY NR switch is moved over IN and OUT.

6-16. CHECKING CUE SIGNAL RECORDING LEVEL

1) Connect a level meter to the OUTPUT terminals of the CUE channel.
2) Load the tape deck with Test Tape MTT-5061 and make the CUE channel ready for recording.
3) Depress the CUE PULSE button and check that the 25 Hz signal is recorded for about a second. At this time the level meter should read 0 to +4 dBV.
4) Reproduce the CUE PULSE signal. The level meter should read –8 to –4 dBV. The OUTPUT control should be set at its maximum position.

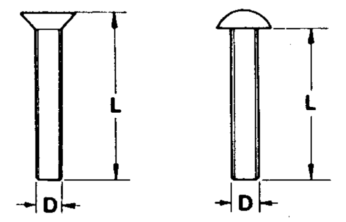
ASSEMBLING HARDWARE CODING LIST

All screws conform to ISO standards, and have crossrecessed heads, unless otherwise noted.
ISO screws have the head inscribed with a point as in the figure to the right.

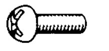
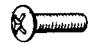
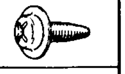
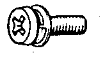
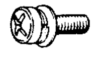


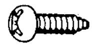
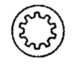
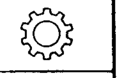
FOR EXAMPLE:

B M 3 x 6
Length in mm (L)
Diameter in mm (D) *
Metric System
Nomenclature



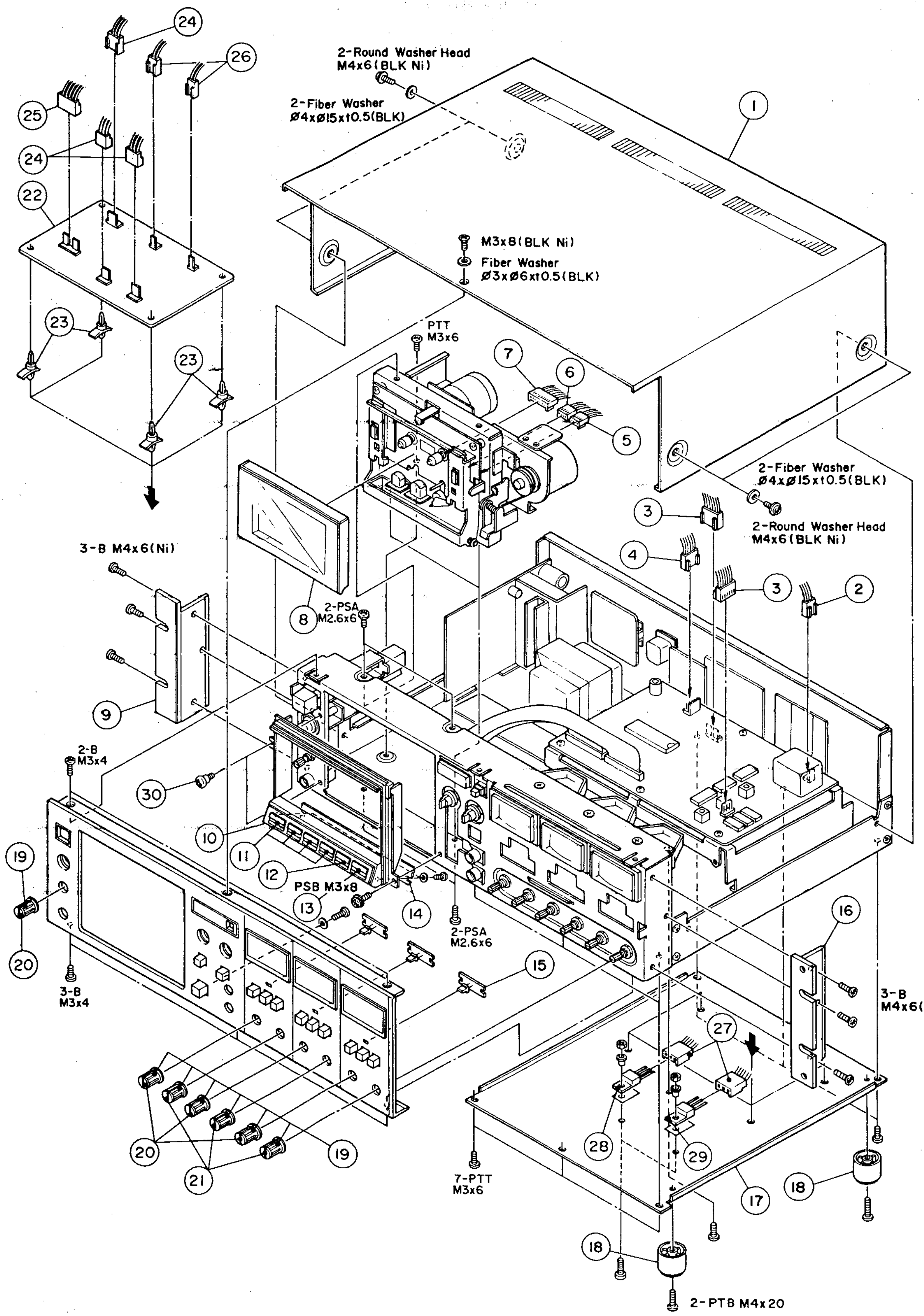
* Inner dia. for washers and nuts

	Code	Name	Type
MACHINE SCREW	**R**	Round Head Screw	
	P	Pan Head Screw	
	T	Stove Head Screw (Truss)	
	B	Binding Head Screw	
	F	Flat Countersunk Head Screw	
	O	Oval Countersunk Head Screw	
WOOD SCREW	**RW**	Round Head Wood Screw	
TAPTITE SCREW	**PTT**	Pan Head Taptite Screw	
	WTT	Washer Head Taptite Screw	
SEMS SCREW	**BSA**	Binding Head SEMS Screw(A Type)	
	BSB	Binding Head SEMS Screw(B Type)	
	BSF	Binding Head SEMS Screw(F Type)	
	PSA	Pan Head SEMS Screw(A Type)	
	PSB	Pan Head SEMS Screw(B Type)	

	Code	Name	Type
TAPPING SCREW	**BTA**	Binding Head Tapping Screw(A Type)	
	BTB	Binding Head Tapping Screw(B Type)	
	RTA	Round Head Tapping Screw(A Type)	
	RTB	Round Head Tapping Screw(B Type)	
SETSCREW	**SF**	Hex Socket Setscrew(Flat Point)	
	SC	Hex Socket Setscrew(Cup Point)	
	SS	Slotted Socket Setscrew(Flat Point)	
WASHER	**E**	E-Ring (Retaining Washer)	
	W	Flat Washer (Plain)	
	SW	Lock Washer (Spring)	
	LWI	Lock Washer (Internal Teeth)	
	LWE	Lock Washer (External Teeth)	
	TW	Trim Washer (Countersunk)	
NUT	**N**	Hex Nut	

7. EXPLODED VIEWS AND PARTS LIST

EXPLODED VIEW-1


2-Round Washer Head M4x6(BLK Ni)
2-Fiber Washer Ø4xØ15xt0.5(BLK)
M3x8(BLK Ni)
Fiber Washer Ø3xØ6xt0.5(BLK)
PTT M3x6
2-Fiber Washer Ø4xØ15xt0.5(BLK)
2-Round Washer Head M4x6(BLK Ni)
3-B M4x6(Ni)
2-PSA M2.6x6
2-B M3x4
PSB M3x8
2-PSA M2.6x6
3-B M3x4
3-B M4x6(Ni)
7-PTT M3x6
2-PTB M4x20
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EXPLODED VIEW-1

REF. NO.	PARTS NO.	DESCRIPTION	COMMON MODELS	REMARKS
1 - 1	*5800132000 1	Cover, Top	122	
1 - 2	*5122165000	Connector Socket, 3P		
1 - 3	*5122168000	Connector Socket, 6P		
1 - 4	*5122167000	Connector Socket, 5P		
1 - 5	*5122148000	Connector Socket, 5P		
1 - 6	*5122147000	Connector Socket, 4P		
1 - 7	*5122150000	Connector Socket, 7P		
1 - 8	5640025100	Cover Assy, Cassette		
1 - 9	*5800173300	Bracket, Handle; L	133	
1 - 10	*5800171901	Escutcheon, Cassette	133	
1 - 11	5800172200	Button, (A)	133	
1 - 12	5800172300	Button, (B)	133	
1 - 13	5800172400	Button, (C)	133	
1 - 14	*5200051300	PCB Assy, SWITCH; 174		
1 - 15	*5200051700	PCB Assy, LED; 145		
1 - 16	*5800173400	Bracket, Handle; R	133	
1 - 17	*5552340204	Chassis, Bottom	A-500	
1 - 18	*5504676000	Foot	A-500	
1 - 19	5800173500	Knob	133	
1 - 20	6006054100	Cap, Knob	M-5	
1 - 21	6006055100	Cap, Knob	M-5	
1 - 22	*5200126600	PCB Assy, BALANCE AMPL.		
1 - 23	*5534726000	Support, Balance Ampl. PCB		
1 - 24	*5122165000	Connector Socket, 3P		
1 - 25	*5122168000	Connector Socket, 6P		
1 - 26	*5122164000	Connector Socket, 2P		
1 - 27	*5336149300	Connector Socket, 3P		
1 - 28	⚠5220413100	IC, NJM78M15A; (U501)		
1 - 29	⚠5220420500	IC, NJM79M15A; (U502)		
1 - 30	*5800559800	Screw, Shoulder; C		

INCLUDED ACCESSORIES

REF. NO.	PARTS NO.	DESCRIPTION	COMMON MODELS	REMARKS
	5128065000	Cord Assy, IN/OUTPUT		
	5350007600	Cord Assy, IN/OUTPUT		
	*5700019602	Owner's Manual (133)		
	*5700019701	Owner's Manual [E, C] (133)		
	*5700051700	Owner's Manual (133-B)		
	*5700051800	Owner's Manual [E, C] (133-B)		
	5504567000	Handle Assy, Audio [E, UK]	C-1	
	*5534659000	Spacer	C-1	
	*5544995000	Washer	C-1	

Parts marked with *require longer delivery time.

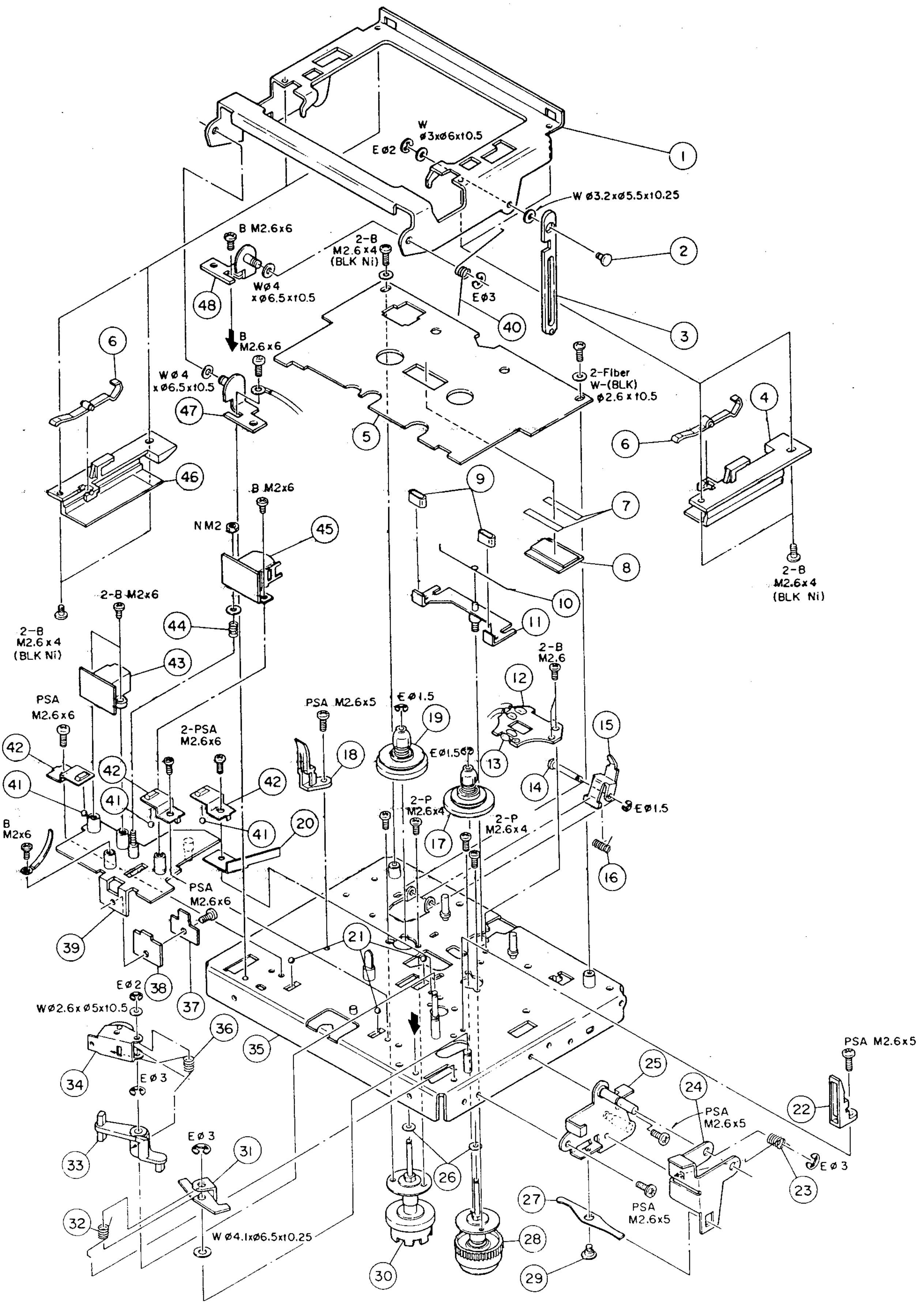
[U] : U.S.A. [C] : CANAD [GE] : GENERAL EXPORT
[A] : AUSTRALIA [E] : EUROPE [UK] : U.K.

EXPLODED VIEW-4

REF. NO.	PARTS NO.	DESCRIPTION	COMMON MODELS	REMARKS
4 - 1	*5504673000	Holder Assy, Damper; C	A-500	
4 - 2	*5555555000	Bracket, Damper	A-500	
4 - 3	~~5370000600~~	Motor Assy, Capstan; DC 5772922400	C-3X	
4 - 4	*5800064601	Plate, Flywheel Base	C-3X	
4 - 5	5534277000	Bearing, Flywheel	A-400	
4 - 6	*5200050200	PCB Assy, Joint; 123		
4 - 7	5504757000	Flywheel Assy, Capstan	f-210	
4 - 8	5163040000	Solenoid, B		
4 - 9	5163039100	Solenoid, A		
4 - 10	5313000500	Solenoid	C-3X	
4 - 11	*5555546000	Arm, Pressure; B	A-500	
4 - 12	*5800176600	Angle, PCB	133	
4 - 13	*5800062600	Lever, Actuating	C-3X	
4 - 14	*5524195000	Spring, Lever	A-500	
4 - 15	*5504666000	Lever Assy, Pause Actuating	A-500	
4 - 16	*5534611000	Arm, Pause Actuating	A-500	
4 - 17	*5800061900	Arm Assy, Actuating	C-3X	
4 - 18	*5504665000	Lever Assy, Actuating	A-500	
4 - 19	*5524213000	Spring, Actuating; A	A-500	
4 - 20	*5800065500	Bracket Assy, Solenoid; B	C-3X	
4 - 21	*5555543000	Bracket, Switch; A	A-500	
4 - 22	5301455500	Switch, Micro		
4 - 23	*5534610000	Arm, Base Actuating	A-500	
4 - 24	*5800062700	Spring, Pulley Guide	C-3X	
4 - 25	*5800062900	Plate, Pulley Guide	C-3X	
4 - 26	*5504667000	Lever Assy, Pause	A-500	
4 - 27	*5524203000	Spring, Damper	A-500	
4 - 28	*5200052000	PCB Assy, Sensor; 110		
4 - 29	*5555556000	Angle, Spring	A-500	
4 - 30	5301455500	Switch, Micro		
4 - 31	*5800062300	Bracket, Switch	C-3X	
4 - 32	*5800062800	Spring, Cassette Pressure	C-3X	
4 - 33	*5800061600	Arm, Cassette Pressure	C-3X	
4 - 34	*5504670000	Lever Assy, Eject	A-500	
4 - 35	*5524199000	Spring, Eject	A-500	
4 - 36	*5800063000	Guide, Actuating Bar	C-3X	
4 - 37	*5800062500	Bar, Brake Actuating	C-3X	
4 - 38	5534130000	Washer, Oil Retaining	A-400	
4 - 39	5504091000	Housing Assy, Capstan	A-170	
4 - 40	5550031000	Washer, Thrust	A-450	
4 - 41	550480800~~0~~1	Pulley Assy, Fast Wind	C-2	
4 - 42	5524274000	Spring, Arm	C-2	
4 - 43	5800063100	Belt, Capstan Drive	C-3X	
4 - 44	5800062400	Pulley, Motor	C-3X	
4 - 45	*5504807001	Plate Assy, Motor	C-2	
4 - 46	7105135000	Motor Assy, Reel; DC	C-2	
4 - 47	*5534537000	Collar, Rubber	A-206	
4 - 48	*5800102100	Angle, Base	C-3X	

Parts marked with *require longer delivery time.

EXPLODED VIEW-3


W
ø3xø6xt0.5
Eø2
1
W ø3.2xø5.5xt0.25
2
B M2.6x6
2-B
M2.6x4
(BLK Ni)
Wø4
xø6.5xt0.5
48
Eø3
40
3
B
M2.6x6
6
Wø4
xø6.5xt0.5
2-Fiber
W-(BLK)
ø2.6xt0.5
47
5
4
6
46
9
7
B M2x6
NM2
45
8
2-B
M2.6x4
(BLK Ni)
10
2-B M2x6
44
11
2-B
M2.6x4
(BLK Ni)
43
2-B
M2.6
12
PSA
M2.6x6
PSA M2.6x5
Eø1.5
19
15
2-PSA
M2.6x6
18
Eø1.5
13
42
42
42
14
Eø1.5
41
41
41
20
2-P
M2.6x4
17
2-P
M2.6x4
B
M2x6
16
PSA
M2.6x6
39
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Wø2.6xø5xt0.5
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Eø3
25
PSA M2.6x5
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PSA
M2.6x5
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PSA
M2.6x5
32
W ø4.1xø6.5xt0.25
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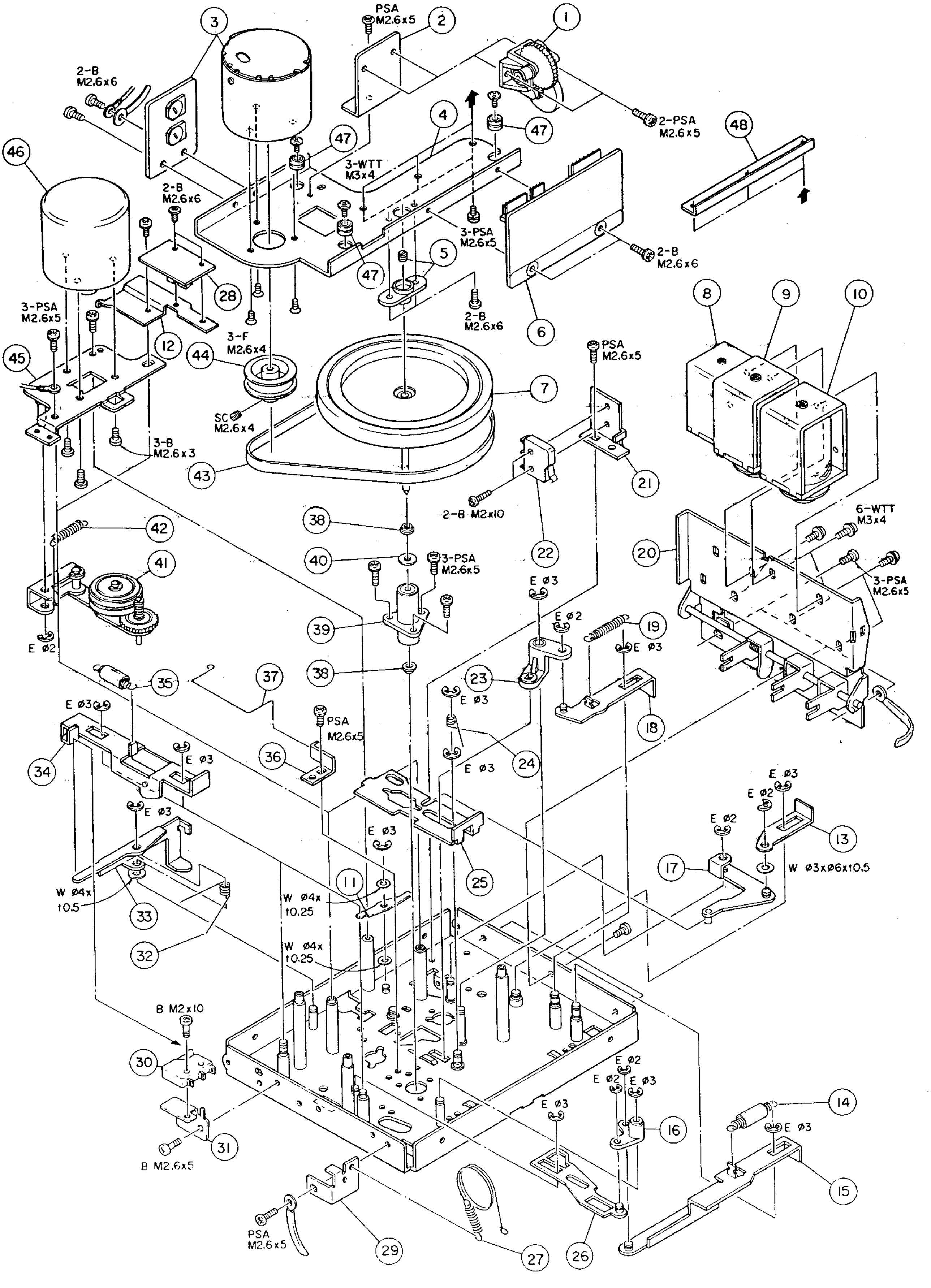
EXPLODED VIEW-3

REF. NO.	PARTS NO.	DESCRIPTION	COMMON MODELS	REMARKS
3 - 1	*5553285001	Holder, Cassette	C-3	
3 - 2	*5544958000	Shaft, Lock	A-500	
3 - 3	*5800245200	Plate, Lock	133	
3 - 4	5534614000	Guide, Cassette; R	A-500	
3 - 5	*5555655000	Plate, Cassette Holder	C-3	
3 - 6	5534615000	Spring, Cassette Pressure	A-500	
3 - 7	*5555582000	Tape, Adhesive	A-300	
3 - 8	*5534638000	Lens, Lamp	A-300	
3 - 9	5534844000	Shoe, Brake	A-430	
3 - 10	5520333000	Spring, Brake	A-105	
3 - 11	*5504669002	Plate Assy, Brake; B	A-500	
3 - 12	*5210048400	PCB, Lamp		
3 - 13	5142026000	Lamp, DC 6V 65mA		
3 - 14	*5544656000	Shaft, Lever	A-105	
3 - 15	*5555544000	Lever, Record Preventing; D	A-500	
3 - 16	*5524197000	Spring, Lever	A-500	
3 - 17	5800063300	Table Assy, Reel; R	C-3X	
3 - 18	*5534683100	Guide, Cassette; L	C-3	
3 - 19	5800063200	Table Assy, Reel; L	C-3X	
3 - 20	*5800216600	Spring, Reel Tension	133	
3 - 21	5540056000	Steel Ball, Φ3	A-450	
3 - 22	*5534444200	Guide, Cassette	A-105	
3 - 23	*5524201000	Spring, Eject Arm	A-500	
3 - 24	*5555551000	Arm, Eject	A-500	
3 - 25	*5800090600	Holder Assy, Switch	C-3X	
3 - 26	5800098500	Cushion; Reel	C-3X	
3 - 27	*5555552000	Arm, Eject Actuating	A-500	
3 - 28	5800063802	Pulley Assy, Reel; R	C-3X	
3 - 29	*5581055000	Screw, Shoulder		
3 - 30	5800175802	Pulley Assy, Reel; L	133	
3 - 31	*5555549000	Arm, Eject Preventing	A-500	
3 - 32	*5524200000	Spring, Arm	A-500	
3 - 33	*5534606000	Arm, Pinch Roller	A-500	
3 - 34	5504828001	Arm Assy, Pinch Roller	C-3	
3 - 35	*5800170200	Chassis Assy, Mechanism	C-4X	
3 - 36	5524285000	Spring, Pinch Roller	C-3	
3 - 37	*5555531000	Plate, Head Base; B	A-500	
3 - 38	*5555530000	Plate, Head Base; A		
3 - 39	*5800176001	Plate Assy, Head Base	133	
3 - 40	*5524202000	Spring, Holder	A-500	
3 - 41	5540055000	Steel Ball, Φ2	A-450	
3 - 42	*5555533001	Plate, Pressure	A-500	
3 - 43	5378600900	Head, Erase		
3 - 44	5524141000	Spring, Height Adjustment	C-1	
3 - 45	5378600800	Head, REC-PLAY		
3 - 46	5534613000	Guide, Cassette; L	A-500	
3 - 47	*5504714000	Bracket Assy, Holder; L	C-3	
3 - 48	*5504715000	Bracket Assy, Holder; R	C-3	

Parts marked with *require longer delivery time.

EXPLODED VIEW-4


③
PSA M2.6x5
②
①
2-B M2.6x6
④
㊼
㊼
3-WTT M3x4
2-PSA M2.6x5
㊽
㊻
2-B M2.6x6
3-PSA M2.6x5
2-B M2.6x6
㊼
⑤
㉘
3-PSA M2.6x5
2-B M2.6x6
⑥
⑧
⑨
⑩
⑫
㊹
3-F M2.6x4
PSA M2.6x5
㊺
⑦
SC M2.6x4
3-B M2.6x3
㉑
㊸
2-B M2x10
㊳
6-WTT M3x4
㊷
⑳
㊵
3-PSA M2.6x5
㉒
3-PSA M2.6x5
㊶
E Ø3
E Ø2
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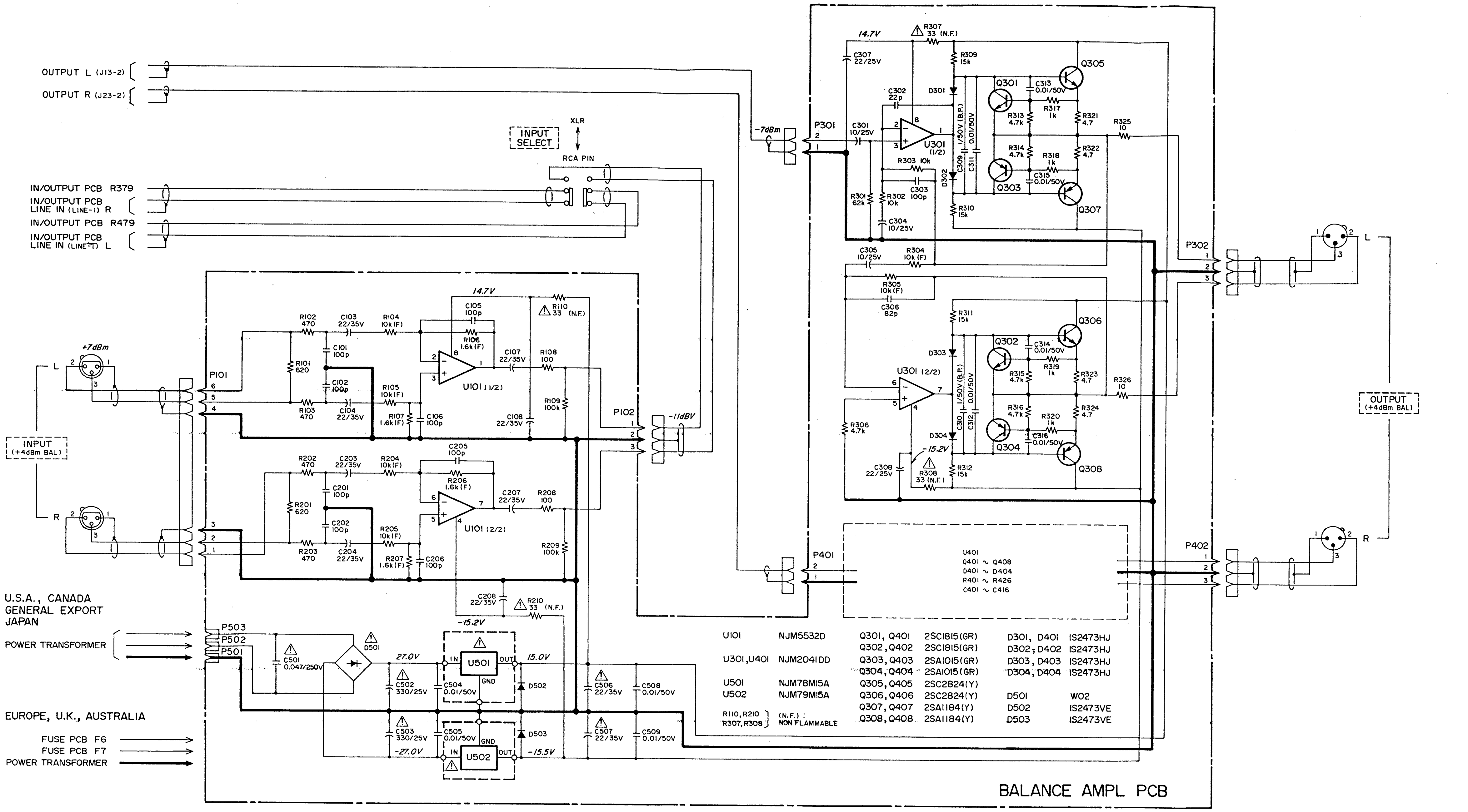
E Ø3
E Ø2
㊳
㉓
㉟
㊲
E Ø3
E Ø3
PSA M2.6x5
⑱
㉞
E Ø3
㊱
E Ø3
㉔
E Ø3
E Ø2
E Ø3
E Ø2
⑬
E Ø3
E Ø3
⑰
W Ø3xØ6xt0.5
㉕
⑪
W Ø4x t0.5
W Ø4x t0.25
㉝
㉜
W Ø4x t0.25
B M2x10
㉚
E Ø2
E Ø2
E Ø3
⑭
E Ø3
⑯
E Ø3
㉛
B M2.6x5
⑮
PSA M2.6x5
㉙
㉗
㉖


OUTPUT L (J13-2)
OUTPUT R (J23-2)
INPUT SELECT
XLR
RCA PIN
IN/OUTPUT PCB R379
IN/OUTPUT PCB LINE IN (LINE-1) R
IN/OUTPUT PCB R479
IN/OUTPUT PCB LINE IN (LINE-1) L
+7dBm
INPUT (+4dBm BAL)
P101
P102
-11dBV
14.7V
U101 (1/2)
U101 (2/2)
U.S.A., CANADA
GENERAL EXPORT
JAPAN
POWER TRANSFORMER
EUROPE, U.K., AUSTRALIA
FUSE PCB F6
FUSE PCB F7
POWER TRANSFORMER
P503
P502
P501
27.0V
-27.0V
15.0V
-15.5V
-15.2V
U501
U502
-7dBm
P301
P401
U301 (1/2)
U301 (2/2)
Q301 Q302 Q303 Q304 Q305 Q306 Q307 Q308
P302
P402
OUTPUT (+4dBm BAL)
L
R
U401
Q401 ∿ Q408
D401 ∿ D404
R401 ∿ R426
C401 ∿ C416
U101 NJM5532D
U301,U401 NJM2041DD
U501 NJM78M15A
U502 NJM79M15A
R110, R210, R307, R308 (N.F.) : NON FLAMMABLE
Q301, Q401 2SC1815(GR)
Q302, Q402 2SC1815(GR)
Q303, Q403 2SA1015(GR)
Q304, Q404 2SA1015(GR)
Q305, Q405 2SC2824(Y)
Q306, Q406 2SC2824(Y)
Q307, Q407 2SA1184(Y)
Q308, Q408 2SA1184(Y)
D301, D401 1S2473HJ
D302, D402 1S2473HJ
D303, D403 1S2473HJ
D304, D404 1S2473HJ
D501 W02
D502 1S2473VE
D503 1S2473VE
BALANCE AMPL PCB

INSTRUCTIONS FOR SERVICE PERSONNEL

BEFORE RETURNING APPLIANCE TO THE CUSTOMER, MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT.

NOTES

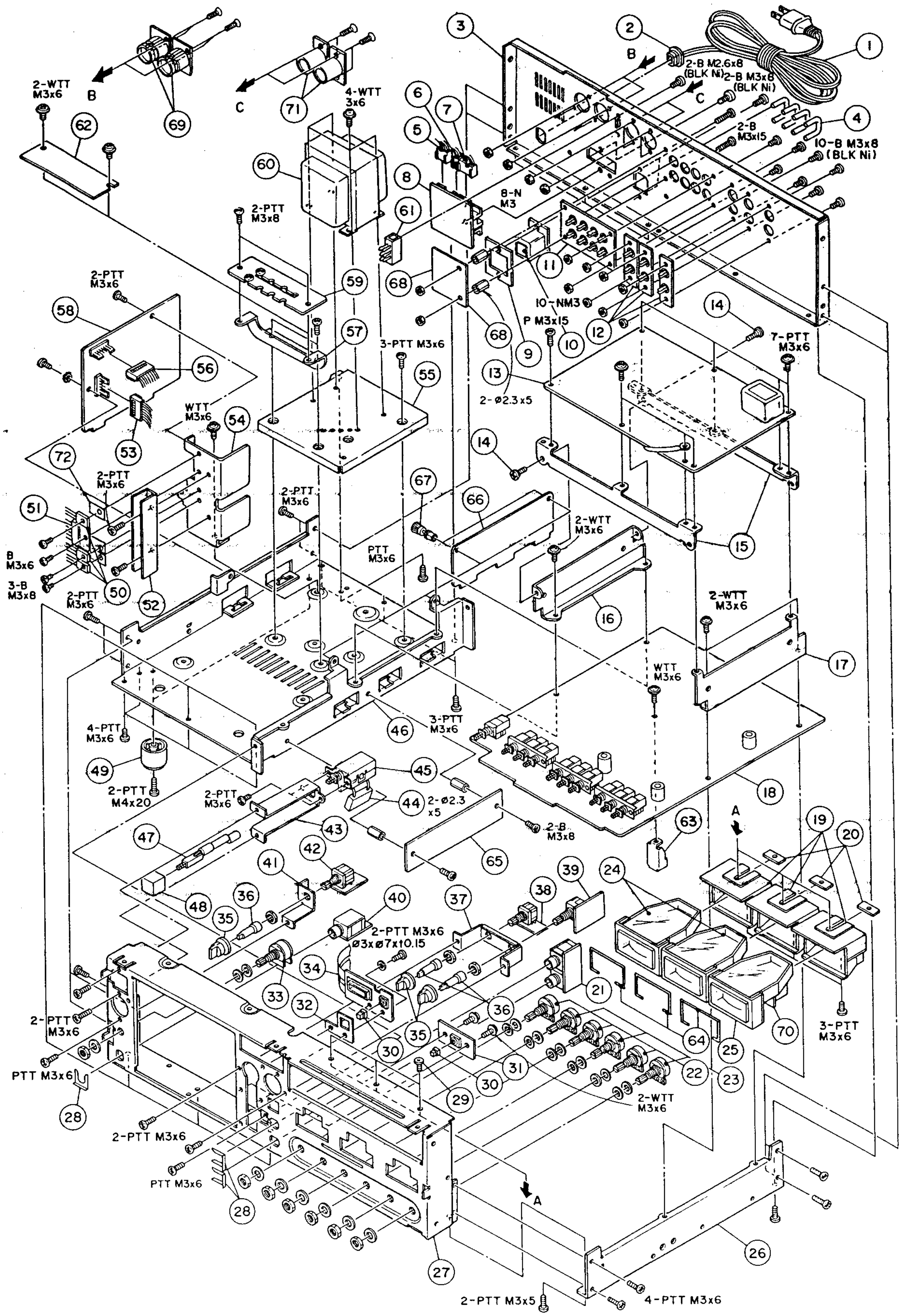
1. All resistors are 1/4 watt, ±5 %, unless marked otherwise. Resistor values are in ohms (k = 1,000 ohms).
2. All capacitor values are in microfarads (p = picofarads).
3. ⚠ Parts marked with this sign are safety critical components. They must alway be replaced with identical components — refer to the TEAC parts list and ensure exact replacement.
4. ☐ : front panel indication
5. ⬚ : rear panel indication
6. DC voltages are reference values.
   DC voltage measurement conditions
   - Measure with DC volt meter
   - Mode REC/PAUSE

TASCAM
TEAC Production Products

133-B
MULTI-IMAGE STEREO PLUS CUE
CASSETTE RECORDER-REPRODUCER

November, 1983

EXPLODED VIEW-5


2-WTT M3x6
B
69
62
C
71
4-WTT 3x6
3
2
B
2-B M2.6x8 (BLK Ni)
2-B M3x8 (BLK Ni)
C
1
6
7
5
2-B M3x15
4
10-B M3x8 (BLK Ni)
60
8
8-N M3
2-PTT M3x8
61
11
59
68
68
10-NM3
P M3x15
12
2-PTT M3x6
58
57
9
10
14
7-PTT M3x6
3-PTT M3x6
55
13
56
2-ø2.3x5
WTT M3x6
54
14
72
53
2-PTT M3x6
67
66
2-PTT M3x6
51
2-WTT M3x6
15
B M3x6
PTT M3x6
3-B M3x8
50
52
2-PTT M3x6
16
2-WTT M3x6
17
WTT M3x6
4-PTT M3x6
3-PTT M3x6
46
49
45
2-PTT M4x20
2-PTT M3x6
44
2-ø2.3 x5
2-B M3x8
18
43
47
63
A
19
20
42
65
41
39
24
48
36
38
35
40
37
2-PTT M3x6
ø3xø7xt0.15
34
33
32
21
36
2-PTT M3x6
30
35
64
70
3-PTT M3x6
31
25
PTT M3x6
30
29
22
23
28
2-WTT M3x6
2-PTT M3x6
PTT M3x6
A
28
26
27
2-PTT M3x5
4-PTT M3x6

EXPLODED VIEW-5

REF. NO.	PARTS NO.	DESCRIPTION	COMMON MODELS	REMARKS
5 - 1	⚠*5350010800	Cord, AC Power [U, GE]		
	⚠*5350008200	Cord, AC Power [E]		
	⚠*5128047000	Cord, AC Power [UK]		
	⚠*5350008300	Cord, AC Power [A]		
	⚠*5350008100	Cord, AC Power [C]		
5 - 2	⚠*5534660000	Strain Relief, AC Power Cord [All except UK, C]		
	⚠*5317001700	Strain Relief, AC Power Cord [UK]		
	⚠*5317001800	Strain Relief, AC Power Cord [C]		
5 - 3	*5800511000	Panel, Rear		
5 - 4	5330505000	Plug, 2P; Shorting		
5 - 5	*5122147000	Connector Socket, 4P		
5 - 6	*5122145000	Connector Socket, 2P		
5 - 7	*5122150000	Connector Socket, 7P		
5 - 8	*5200051200	PCB Assy, REMOTE; 111		
5 - 9	*5555700000	Nut, Plate	X-10R	
5 - 10	*5122339000	Connector Socket, 6P		
5 - 11	*5124053000	Jack, Pin; 8P		
5 - 12	*5124056000	Jack, Pin; 2P		
5 - 13	*5200051809	PCB Assy, OSC; 107		
5 - 14	*5581056000	Screw, Shoulder	A-304	
5 - 15	*5555881000	Bracket, PCB		
5 - 16	*5800172800	Bracket, OSC PCB; L	A-550RX	
5 - 17	*5800172900	Bracket, OSC PCB; R	133	
5 - 18	*5200096201	PCB Assy, REC-PLAY AMPL		
5 - 19	*5800176901	Holder, Meter	133	
5 - 20	*5800176800	Nut, Meter	133	
5 - 21	*5200049100	PCB Assy, MIC JACK		
5 - 22	5282010502	Variable Resistor 100kΩ(A)		
5 - 23	5282010402	Variable Resistor 50kΩ(A)		
5 - 24	5296003100	Meter, VU	133	
5 - 25	5296003200	Meter, Peak	133	
5 - 26	*5553269101	Chassis, L	A-500	
5 - 27	*5800171801	Chassis, Front	133	
5 - 28	*5800178500	Stopper, Jack	133	
5 - 29	*5581055000	Screw, Shoulder; D	ff-50	
5 - 30	5800177300	Button, C		
5 - 31	*5200049000	PCB Assy, Switch; 177		
5 - 32	*5800180300	Spacer, Push; C	133	
5 - 33	5282407602	Variable Resistor 50kΩ(A) x 2		
5 - 34	*5200051500	PCB Assy, Counter; 103		
5 - 35	5800176700	Knob, Rotary	133	
5 - 36	*5800178100	Rod, Joint	133	
5 - 37	*5800177900	Bracket, Switch; A	133	
5 - 38	*5200048800	PCB Assy, Switch; 175		
5 - 39	*5200048900	PCB Assy, Switch; 176		
5 - 40	*5200049200	PCB Assy, PHONES; 102		
5 - 41	*5800178000	Bracket, Switch; B	133	
5 - 42	*5200048700	PCB Assy, Switch; 173		
5 - 43	*5555561000	Bracket, Power Switch	A-500	
5 - 44	⚠ 5052906000	Spark Killer 0.033µF + 120Ω/250V [U]		
	⚠ 5052907000	Spark Killer 0.01µF + 300Ω/400V [GE]		
	⚠ 5052911000	Spark Killer 0.033µF + 120Ω/250V [C]		
	⚠ 5267702500	Spark Killer 4700pF/250V [E, UK, A]		
5 - 45	⚠ 5300019300	Switch, Power [U, C]		
	⚠ 5300019400	Switch, Power [E, UK, A]		
	⚠ 5134122000	Switch, Power [GE]		
5 - 46	*5551031200	Chassis, R	A-500	
5 - 47	*5800116200	Rod, Power Switch		

Parts marked with *require longer delivery time.

[U] : U.S.A.
[A] : AUSTRALIA
[C] : CANAD
[E] : EUROPE
[GE] : GENERAL EXPORT
[UK] : U.K.

REF. NO.	PARTS NO.	DESCRIPTION	COMMON MODELS	REMARKS
5 - 48	5800173100	Button, Power	133	
5 - 49	*5504676000	Foot	A-500	
5 - 50	5231755500	Transistor, 2SD985		
5 - 51	5220411500	IC, BA6109		
5 - 52	*5800180200	Heat Sink, B	133	
5 - 53	*5122228000	Connector Socket, 9P		
5 - 54	*5800178200	Heat Sink		
5 - 55	*5553353104	Bracket, Transformer; B	C-3	
5 - 56	*5122228000	Connector Socket, 9P		
5 - 57	*5555060000	Bracket, B [GE, E, UK, A]	A-105	
5 - 58	*5200050807	PCB Assy, POWER SUPPLY		
5 - 59	*5168548100	PCB Assy, VOLTAGE SELECTOR [GE]		
5 - 60	⚠ 5320024801	Transformer, Power [U, C]		
	⚠ 5320024901	Transformer, Power [GE]		
	⚠ 5320025001	Transformer, Power [E, UK, A]		
5 - 61	5300910200	Switch, Slide		
5 - 62	*5200132100	PCB Assy, FUSE [E, UK, A]		
5 - 63	*5555565200	Angle, PCB	A-500	
5 - 64	*5800246400	Spring, Meter Cover	133	
5 - 65	*5200072910	PCB Assy, muting		
5 - 66	*5200061501	PCB Assy, Phone Ampl.		
5 - 67	*5534473000	T-Type, Rivet	A-770	
5 - 68	*5200064500	PCB Assy, Control; 134		
5 - 69	5334027200	Connector Socket, Canon; 3P		
5 - 70	*5200051100	PCB Assy, Lamp		
5 - 71	5334027300	Connector Socket, Canon; 2P		
5 - 72	*5317000300	Plate, Insulating		

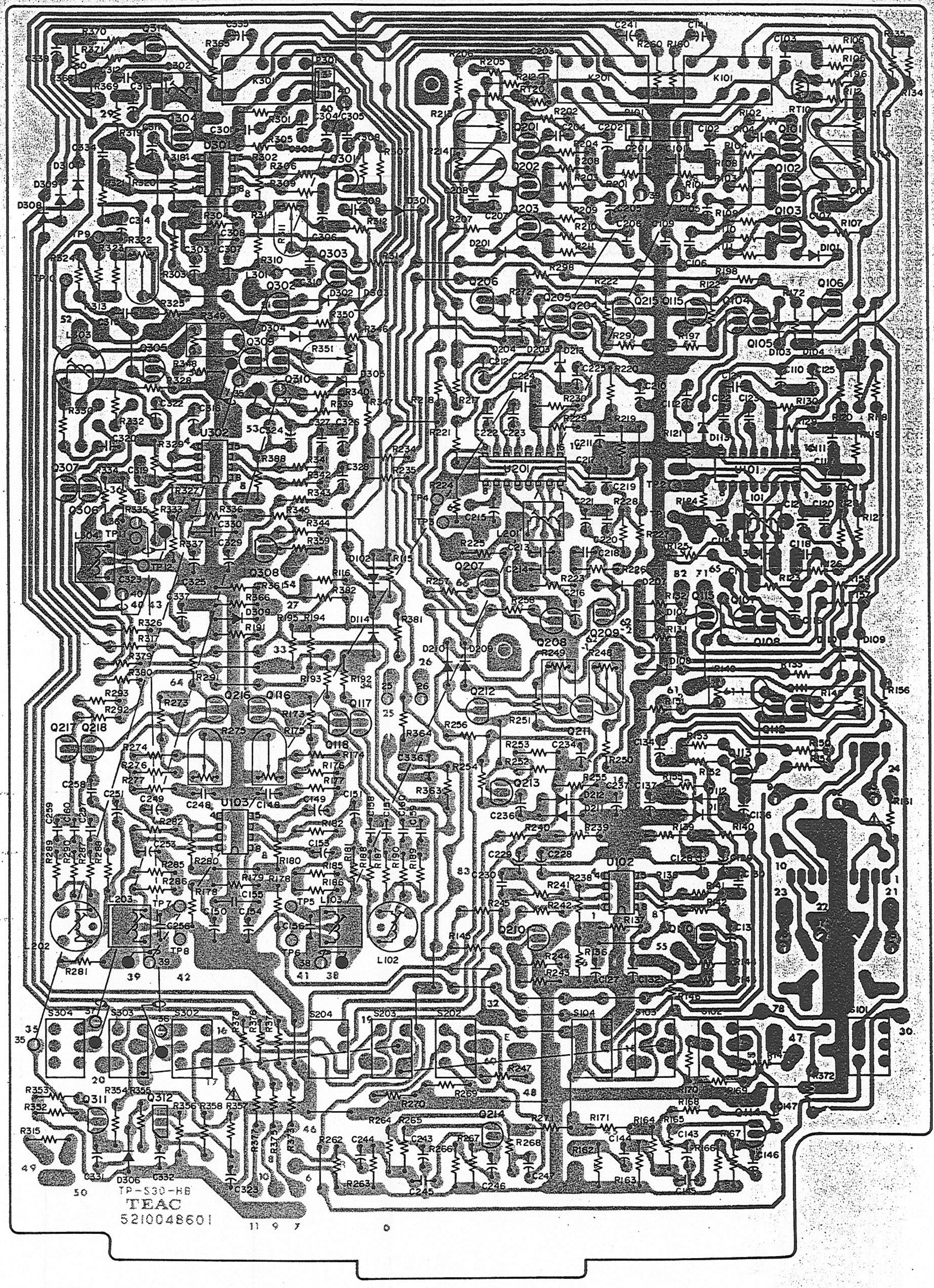
Parts marked with *require longer delivery time.

[U] : U.S.A.
[A] : AUSTRALIA
[C] : CANAD
[E] : EUROPE
[GE] : GENERAL EXPORT
[UK] : U.K.

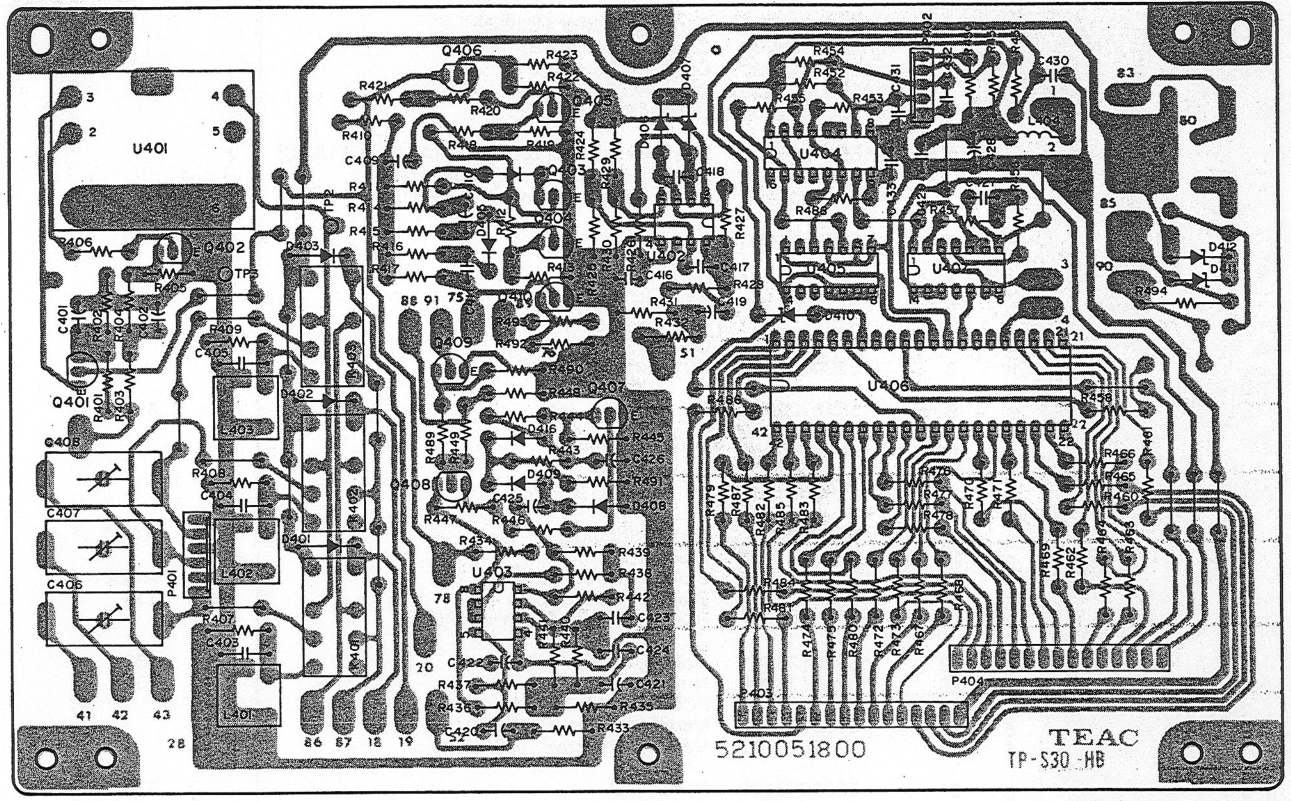
8. PC BOARD AND PARTS LIST

PC Boards shwon viewed from foil side.

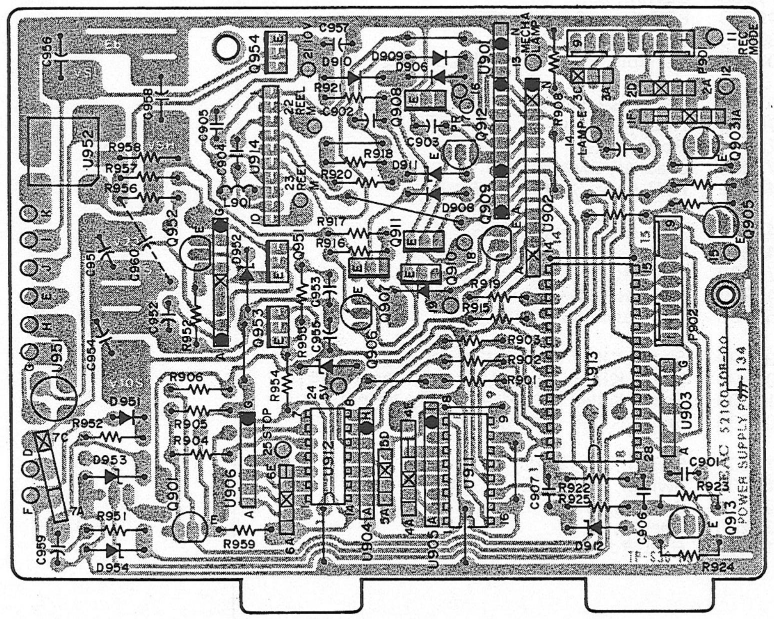
REC/PLAY AMPL. PCB Assy


TP-S30-HB
TEAC
5210048601

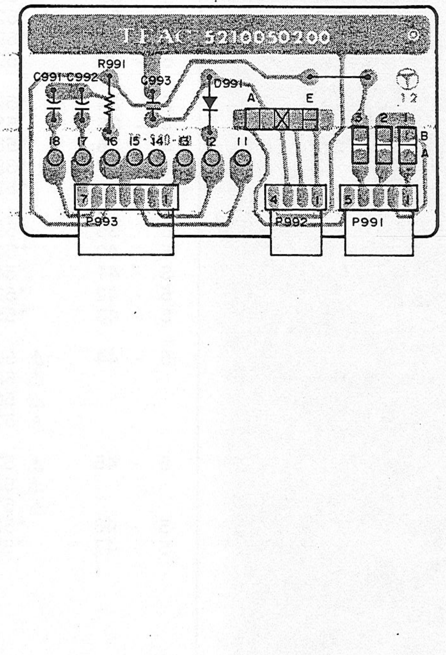
OSC PCB 107 Assy


U401
U406
5210051800
TEAC
TP-S30-HB

POWER SUPPLY PCB Assy



JOINT PCB 123 Assy


TEAC 5210050200
P993
P992
P991

REC/PLAY AMPL. PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200096201	PCB Assy
	*5210048601	PCB

IC's

REF. NO.	PARTS NO.	DESCRIPTION
U101, U201	5147046000	NE-646B
U102, U103	5220410900	TA75589P
U301	5220411600	TL4558P
U302	5220410900	TA75558P

TRANSISTORS

REF. NO.	PARTS NO.	DESCRIPTION
Q101, Q201	5145119000	2SC1844F
Q102, Q202	5042461000	2SC1327T
Q103 Q203	5145103000	FET, 2SK68AM
Q104, Q204	5145185000	2SD655E
Q105, Q205	5145103000	FET, 2SK68AM
Q106, Q206	5145103000	FET, 2SK68AM
Q107 ,Q207	5145103000	FET, 2SK68AM
Q108, Q208	5145103000	FET, 2SK68AM
Q109, Q209	5145103000	FET, 2SK68AM
Q110, Q210	5230775000	2SC2878B
Q111, Q211	5145103000	FET, 2SK68AM
Q112, Q212	5145103000	FET, 2SK68AM
Q113, Q213	5145183000	FET, 2SK68AMI
Q114, Q214	5145119000	2SC1844F
Q115, Q215	5145091000	2SC945AK
Q116, Q216	5145185000	2SD655E
Q117, Q217	5145091000	2SC945AK
Q118, Q218	5145091000	2SC945AK
Q301～Q303	5145103000	FET, 2SK68AM
Q304, Q305	5145185000	2SD655E
Q306, Q307	5145091000	2SC945AK
Q308	5230775000	2SC2878B
Q309, Q310	5145103000	FET, 2SK68AM
Q311	5145183000	FET, 2SK68AMI
Q312	5145110000	2SC1637-1
Q314	5145082000	2SC2060Q

DIODES

REF. NO.	PARTS NO.	DESCRIPTION
D101, D201	5224012510	1S2076
D102	5224012510	1S2076
D103, D203	5224012510	1S2076
D104, D204	5224012510	1S2076
D105, D205	5224012510	1S2076
D106, D206	5224012510	1S2076
D107, D207	5224012510	1S2076
D108	5224012510	1S2076
D109, D209	5224012510	1S2076
D110, D210	5224012510	1S2076
D111, D211	5224012510	1S2076
D112, D212	5224012510	1S2076
D113, D213	5224543501	Zener, RD13EB3
D114	5224012510	1S2076
D301～D307	5224012510	1S2076
D308～D310	5224013210	DS135D

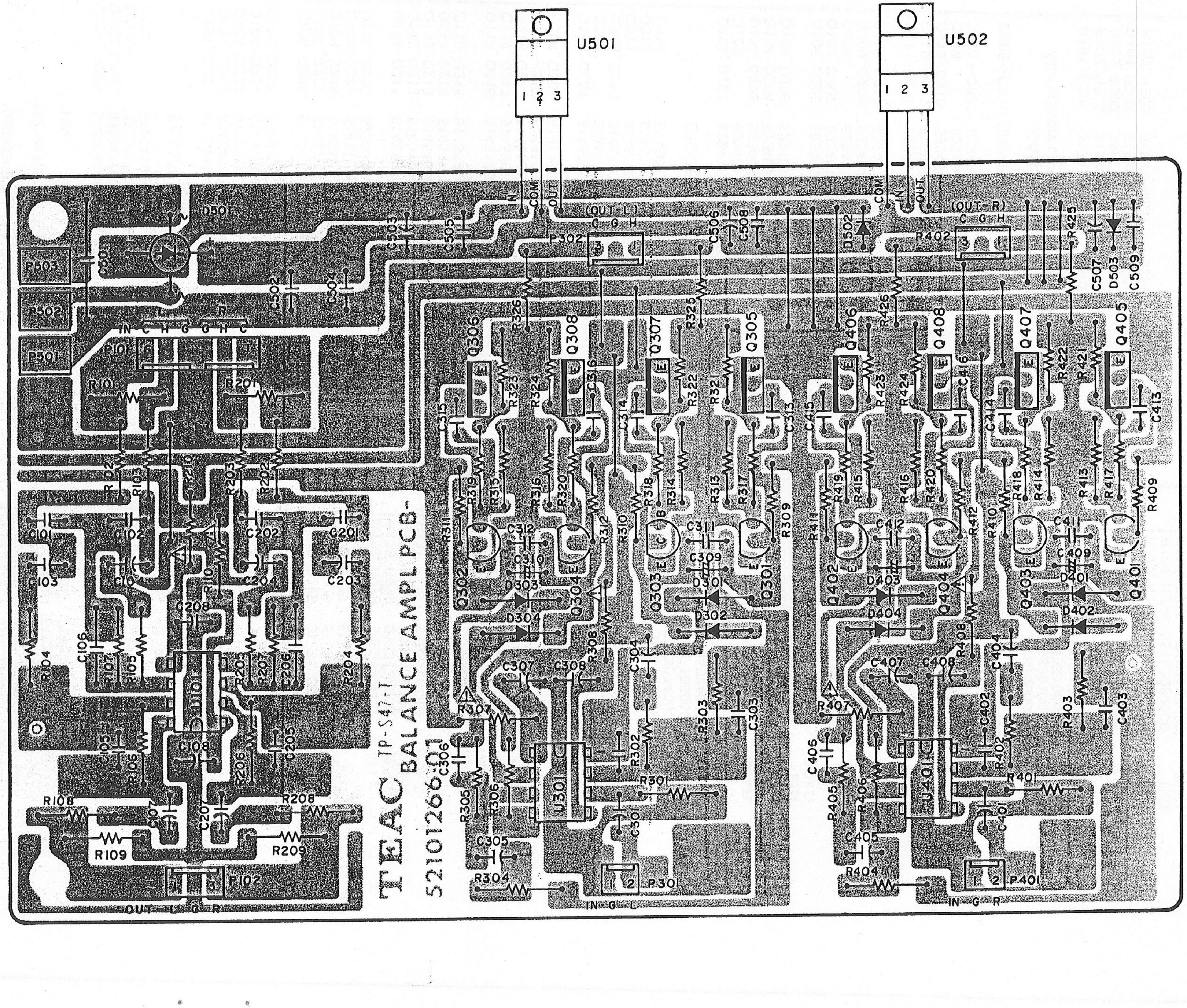
CARBON RESISTORS

All resistors are rated ±5% tolerance and 1/4 watt.

REF. NO.	PARTS NO.	DESCRIPTION
R101, R201	5183154000	1MΩ
R102, R202	5183070000	330Ω
R103, R203	5183122000	47kΩ
R104, R204	5183058000	100Ω
R105, R205	5183118000	33kΩ
R106, R206	5183098000	4.7kΩ
R107, R207	5183098000	4.7kΩ
R108, R208	5183072000	390Ω
R109, R209	5183140000	270kΩ
R110, R210	5183094000	3.3kΩ
R111, R211	5183092000	2.7kΩ
R112, R212	5183104000	8.2kΩ
R115	5183142000	330kΩ
R116	5183130000	100kΩ
R117, R217	5183064000	180Ω
R118, R218	5183064000	180Ω
R119, R219	5183082000	1kΩ
R120, R220	5183082000	1kΩ
R121, R221	5183082000	1kΩ
R122, R222	5183130000	100kΩ
R123, R223	5183118000	33kΩ
R124, R224	5183118000	33kΩ
R125, R225	5183118000	33kΩ
R126, R226	5183058000	100Ω
R127, R227	5183094000	3.3kΩ
R128, R228	5183122000	47kΩ
R129, R229	5183136000	180kΩ
R130, R230	5183138000	220kΩ
R131	5183140000	270kΩ
R132	5183122000	47kΩ
R133	5183098000	4.7kΩ
R134, R234	5183130000	100kΩ
R135, R235	5183130000	100kΩ
R136	5183106000	10kΩ
R137	5183106000	10kΩ
R138, R238	5183130000	100kΩ
R139, R239	5183110000	15kΩ
R140, R240	5183092000	2.7kΩ
R141, R241	5183106000	10kΩ
R142, R242	5183074000	470Ω
R143, R243	5183146000	470kΩ
R144, R244	5183074000	470Ω
R145, R245	5183106000	10kΩ
R146	5183074000	470Ω
R147, R247	5183122000	47kΩ
R150, R250	5183130000	100kΩ
R151, R251	5183106000	10kΩ
R152, R252	5183146000	470kΩ
R153, R253	5183038000	15Ω
R154, R254	5183096000	3.9kΩ
R155, R255	5183078000	680Ω
R156, R256	5183090000	2.2kΩ
R157, R257	5183168000	10MΩ
R158, R258	5183168000	10MΩ
R160, R260	5183070000	330Ω
R161	⚠5184225000	10Ω, Nonflammable
R162, R262	5183130000	100kΩ
R163, R263	5183114000	22kΩ
R164, R264	5183146000	470kΩ
R165, R256	5183034000	10Ω
R166, R266	5183050000	47Ω
R167, R267	5183070000	330Ω
R168, R268	5183108000	12kΩ
R169, R269	5183130000	100kΩ
R170, R270	5183082000	1kΩ
R171, R271	5183090000	2.2kΩ
R172, R272	5183130000	100kΩ
R173, R273	5183114000	22kΩ
R174, R274	5183082000	1kΩ
R176, R276	5183126000	68kΩ

Parts marked with *require longer delivery time.

BALANCE AMPL. PCB ASSY


U501
1 2 3
N COM OUT
U502
1 2 3
COM IN OUT
D501
P503
P502
P501
C501
C502
C503
C504
C505
C506
C508
(OUT-L)
C G H
P302
(OUT-R)
C G H
D502
R402
R425
C507
D503
C509
IN C H G G H C
L R
R101
R201
R102
R103
R210
R203
R202
C101
C102
C202
C201
C103
C104
C204
C203
C208
R110
C106
R107
R105
R205
R207
C206
R204
R104
U101
C105
R106
C108
R206
C205
R108
C107
C207
R208
R109
R209
P102
OUT L G R
TEAC
TP-S47-T
BALANCE AMPL PCB-
5210126601
R326
Q306
Q308
R325
Q307
Q305
R323
R324
C316
R322
R321
C315
C314
C313
R319
R315
R316
R320
R318
R314
R313
R317
R309
R311
R312
R310
C312
C311
C310
C309
Q302
Q304
Q303
Q301
D303
D301
D304
D302
R308
C307
C308
C304
R307
R303
C303
R302
C306
R305
R306
U301
R301
C301
C305
R304
P301
IN G L
Q406
R426
Q408
Q407
Q405
R423
R424
C416
R422
R421
C415
C414
C413
R419
R415
R416
R420
R418
R414
R413
R417
R409
R411
R412
R410
C412
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Q402
Q404
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Q401
D403
D401
D404
D402
R408
C407
C408
C404
R407
C402
R403
C403
C406
R405
R406
U401
R402
R401
C401
C405
R404
P401
IN G R

REF. NO.	PARTS NO.	DESCRIPTION
C153, C253	5260162550	Elec. 10µF 16V
C154	5260163452	Elec. 22µF 25V
C155	5173435000	Ceramic 0.047µF 50V +80%−20%
C156, C256	5170409000	Mylar 2200pF 100V 5%
C157, C257	5170423000	Mylar 8200pF 100V 5%
C158, C258	5170425000	Mylar 0.01µF 100V 5%
C159, C259	5170415000	Mylar 3900pF 100V 5%
C160, C260	5170421000	Mylar 6800pF 100V 5%
C301	5263107020	Polypro. 470pF 100V 5%
C302	5171590000	Elec. LR 10µF 16V
C303	5260166052	Elec. 100µF 16V
C304	5171598000	Elec. 47µF 10V
C305	5170425000	Mylar 0.01µF 100V 5%
C306	5260220850	Elec. LL 0.33µF 50V
C307	5260166152	Elec. 100µF 25V
C308	5173435000	Ceramic 0.047µF 50V +80%−20%
C309	5263107200	Polypro. 560pF 100V 5%
C310	(deleted)	
C311	5260220850	Elec. LL 0.33µF 50V
C312	5170409000	Mylar 2200pF 100V 5%
C313	5260163452	Elec. 22µF 16V
C314	5260162550	Elec. 10µF 16V
C315	5170445000	Mylar 0.068µF 100V 5%
C316	5260160750	Elec. 16µF 16V
C317	5260162550	Elec. 10µF 16V
C319	5260162550	Elec. 10µF 16V
C320	5170423000	Mylar 8200pF 100V 5%
C321	(deleted)	
C322	5170417000	Mylar 4700pF 100V 5%
C323	5170409000	Mylar 2200pF 100V 5%
C324	5260160750	Elec. 1µF 50V
C325	5260162550	Elec. 10µF 16V
C326	5260162550	Elec. 10µF 16V
C327	5172208000	Ceramic 47pF 50V 10%
C328	5260162550	Elec. 10µF 16V
C329	5260166152	Elec. 100µF 25V
C330	5173435000	Ceramic 0.047µF 25V +80%−20%
C331	5260220550	Elec. LL 0.1µF 50V
C332	5260163452	Elec. 22µF 25V
C333	5260165252	Elec. 47µF 25V
C334	5172204000	Ceramic 22pF 50V 10%
C335	5173048800	Elec. 100µF 25V
C336	5260160750	Elec. 1µF 50V
C337	5260162550	Elec. 10µF 16V
C338	5260163452	Elec. 22µF 16V
C339	5173073000	Elec. 470µF 25V
	THERMISTORS	
RT10, RT20	5143127000	S5C14
	VARIABLE RESISTORS	
R113, R213	5280004002	Semi-fixed 50kΩ(B)
R114, R214	5280004002	Semi-fixed 50kΩ(B)
R148, R248	5280004302	Semi-fixed 200kΩ(B)
R149, R249	5280004002	Semi-fixed 50kΩ(B)
R175, R275	5280004002	Semi-fixed 50kΩ(B)
R311, R322	5280004002	Semi-fixed 50kΩ(B)
R349	5280004002	Semi-fixed 50kΩ(B)
R351	5280004302	Semi-fixed 200kΩ(B)
	COILS	
L101, L201	5056655000	Trap, 12mH
L102, L202	5160042000	Record EQ, 3.6mH
L103, L203	5056659000	Trap, 3mH
L301	(deleted)	
L302	5056659000	Trap, 3mH

Parts marked with *require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION
L303	5160042000	Record EQ, 3.6mH
L304	5056659000	Trap, 3mH
	MISCELLANEOUS	
U303	5292803200	Filter, Low-path 58kHz
K101, K201	5290008900	Relay, G2V-2 24V
K301	5290008900	Relay, G2V-2 24V
P101	5122130000	Connector Plug, 6P(WHT)
P301	5122127000	Connector Plug, 3P(WHT)
	5300022900	Switch Push
	5300023000	Switch Push, 3-gang

OSC PCB 107 ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200051809	PCB 107 Assy
	*5210051800	PCB
	IC's	
U402, R403	5220410900	TA75558P
U404	5220020000	TC4049BP
U405	5220014900	MSM4013RS
U406	5220018800	LM8523
U407	5220013700	MSM4011RS
	TRANSISTORS	
Q401, Q402	5145082000	2SC2060Q
Q403~Q405	5145091000	2SC945AK
Q406	5042553000	2SA733P
Q407	5145091000	2SC945AK
Q408	5042553000	2SA733P
Q409, Q410	5145091000	2SC945AK
	DIODES	
D401~D403	5224013210	DS135D
D404, D405	5224012510	1S2076
D406, D407	5143184000	Zener, EQA01-06S
D408, D409	5224012510	1S2076
D410	5143143000	Zener, RD4.3E
D411, D412	5224563501	Zener, RD5.6FBB2
D416	5224012500	1S2076
	CARBON RESISTORS **All resistors are rated ±5% tolerance and 1/4 watt.**	
R401	5183076000	560Ω
R402	5183092000	2.7kΩ
R403	5183074000	470Ω
R404	5183104000	8.2kΩ
R405	5183114000	22kΩ
R406	5183010000	1Ω
R407~R409	5183100000	5.6kΩ
R410	5183082000	1kΩ
R411	5183098000	4.7kΩ
R412	5183134000	150kΩ
R413	5183122000	47kΩ
R414	5183130000	100Ω
R415	5183098000	4.7kΩ
R416~R418	5183122000	47kΩ
R419	5183098000	4.7kΩ

REF. NO.	PARTS NO.	DESCRIPTION
R176, R277	5183118000	33kΩ
R178	5183106000	10kΩ
R179	5183106000	10kΩ
R180, R280	5183138000	220kΩ
R181, R281	5183094000	3.3kΩ
R182, R282	5183118000	33kΩ
R184	5183074000	470Ω
R185, R285	5183130000	100kΩ
R186, R286	5183106000	10kΩ
R187, R287	5183058000	100Ω
R188, R288	5183114000	22kΩ
R189, R289	5183058000	100Ω
R190, R290	5183106000	10kΩ
R191, R291	5183106000	10kΩ
R192, R292	5183098000	4.7kΩ
R193, R293	5183098000	4.7kΩ
R194, R294	5183130000	100kΩ
R195, R295	5183130000	100kΩ
R196, R296	5183114000	22kΩ
R197, R297	5183150000	680kΩ
R198, R298	5183146000	470kΩ
R301	5183154000	1MΩ
R302	5183130000	100kΩ
R303, R304	5183106000	10kΩ
R305	5183058000	100Ω
R306	5183142000	330kΩ
R307	5183094000	3.3kΩ
R308	5183092000	2.7kΩ
R309	5183074000	470Ω
R310	5183104000	8.2kΩ
R312	5183106000	10kΩ
R313	5183114000	22kΩ
R314	5183074000	470Ω
R315	5183128000	82kΩ
R316	5183154000	1MΩ
R317, R318	5183130000	100kΩ
R319	5183082000	1kΩ
R320	5183114000	22kΩ
R321	5183074000	470Ω
R323	5183082000	1kΩ
R324	5183126000	68kΩ
R325	5183118000	33kΩ
R326	5183106000	10kΩ
R327	5183130000	100kΩ
R328	5183094000	3.3kΩ
R329	5183118000	33kΩ
R330	5183068000	270Ω
R331	(deleted)	
R332	5183092000	2.7kΩ
R333	5183092000	2.7kΩ
R334	5183124000	56kΩ
R335~R337	5183106000	10kΩ
R338	5183130000	100kΩ
R339	5183110000	15kΩ
R340	5183092000	2.7kΩ
R341	5183106000	10kΩ
R342	5183074000	470Ω
R343, R344	5183106000	10kΩ
R345	5183074000	470Ω
R346, R347	5183130000	100kΩ
R348	5183098000	4.7kΩ
R350	5183130000	100kΩ
R352	5183146000	470kΩ
R353	5183038000	15Ω
R354	5183096000	3.9kΩ

REF. NO.	PARTS NO.	DESCRIPTION
R355	5183114000	22kΩ
R356	5183146000	470kΩ
R357	⚠5184249000	100Ω, Nonflammable
R358	5183112000	18kΩ
R359	5183074000	470Ω
R360	5183150000	680kΩ
R361	5183090000	2.2kΩ
R363	5183130000	100kΩ
R364	5183058000	100Ω
R365	5183070000	330Ω
R366	5183082000	1kΩ
R368	5183130000	100kΩ
R369	5183058000	100Ω
R370	5183104000	8.2kΩ
R371	5183114000	22kΩ
R372	5181763000	Jumper
R373~R378	5183082000	1kΩ
R379, R380	5183098000	4.7kΩ
R381, R382	5183106000	10kΩ

CAPACITORS

REF. NO.	PARTS NO.	DESCRIPTION			
C101, C201	5263107010	Polypro.	470pF	100V	5%
C102, C202	5260221950	Elec.	10μF	16V	
C103, C203	5260164252	Elec.	33μF	16V	
C104, C204	5172204000	Ceramic	22pF	50V	10%
C105, C205	5260165052	Elec.	47μF	10V	
C106, C206	5170425000	Mylar	0.01μF	100V	5%
C107, C207	5260225810	Elec. LL	0.33μF	50V	
C108, C208	5170409000	Mylar	2200pF	100V	5%
C109	5260160750	Elec.	1μF	50V	
C110, C210	5173054800	Elec.	220μF	16V	
C111, C211	5260166852	Elec.	220μF	10V	
C112, C212	5260225810	Elec. LL	0.33μF	50V	
C113, C213	5263107200	Polypro.	560pF	100V	5%
C114, C214	5170407000	Mylar	1800pF	100V	5%
C115, C215	5260162550	Elec.	10μF	16V	
C116, C216	5260162550	Elec.	10μF	16V	
C117, C217	5172224000	Ceramic	1000pF	50V	10%
C118, C218	5170419000	Mylar	5600pF	100V	5%
C119, C219	5170435000	Mylar	0.027μF	100V	5%
C120, C220	5170417000	Mylar	4700pF	100V	5%
C121, C221	5260162550	Elec.	10μF	16V	
C122, C222	5170441000	Mylar	0.047μF	100V	5%
C123, C223	5260162550	Elec.	10μF	10V	
C124, C224	5170449000	Mylar	0.1μF	100V	5%
C125, C225	5260225810	Elec. LL	0.33μF	50V	
C127	5260162550	Elec.	10μF	16V	
C128, C228	5260221150	Elec.	1μF	50V	
C129, C229	5260162550	Elec.	10μF	16V	
C130, C230	5172208000	Ceramic	47pF	50V	10%
C131, C231	5260221950	Elec.	10μF	16V	
C132	5260166152	Elec.	100μF	25V	
C133	5054230000	Ceramic	0.047μF	50V	10%
C134, C234	5260162650	Elec.	10μF	25V	
C136, C236	5260160750	Elec.	1μF	50V	
C137, C237	5260163252	Elec.	22μF	10V	
C141, C241	5173048800	Elec.	100μF	50V	
C143, C243	5260162650	Elec.	10μF	25V	
C144, C244	5171590000	Elec.	10μF	16V	
C145, C245	5172216000	Ceramic	220pF	50V	10%
C146, C246	5171598000	Elec.	47μF	10V	
C147, C247	5260221550	Elec.	4.7μF	35V	
C148, C248	5170445000	Mylar	0.068μF	100V	5%
C149, C249	5260220950	Elec.	0.47μF	50V	
C150	5260162550	Elec.	10μF	16V	
C151, C251	5260162550	Elec.	10μF	16V	

REF. NO.	PARTS NO.	DESCRIPTION			
R910	5183108000	12kΩ			
R913	5183090000	2.2kΩ			
R914	5183108000	12kΩ			
R915	5183100000	5.6kΩ			
R916	5183090000	2.2kΩ			
R917	5183086000	1.5kΩ			
R918	5183096000	3.9kΩ			
R919~R921	5183086000	1.5kΩ			
R922	5183118000	33kΩ			
R923	5183108000	12kΩ			
R924, R925	5183130000	100kΩ			
R951	5183090000	2.2kΩ			
R952	⚠5184263000	390Ω, Nonflammable			
R953	5183102000	6.8kΩ			
R954, R955	5183086000	1.5kΩ			
R956	5183090000	2.2kΩ			
R957	5183086000	1.5kΩ			
R958	5183110000	15kΩ			
R959	5181470000	330Ω			
	CAPACITORS				
C901	5173435000	Ceramic	0.047μF	50V	
C902	5260163452	Elec.	22μF	25V	
C903	5260166752	Elec.	220μF	6.3V	
C904, C905	5173435000	Ceramic	0.047μF	50V	
C906, C907	5172792000	Styl.	33pF	50V	5%
C909	5260160750	Elec.	1μF	50V	
C951	⚠5173084000	Elec.	1000μF	50V	
C952	5260165352	Elec.	47μF	35V	
C953	5260166152	Elec.	100μF	25V	
C954	⚠5173082000	Elec.	1000μF	25V	
C955	5260166052	Elec.	100μF	16V	
C956	⚠5173089000	Elec.	2200μF	25V	
C957	5260166052	Elec.	100μF	16V	
C958	⚠5262002300	Elec.	2200μF	50V	
C959	5260163452	Elec.	22μF	16V	
C960	5260166052	Elec.	100μF	16V	
	COIL				
L901	5286013800	Choke, 2mH			
	MISCELLANEOUS				
P901	5122190000	Connector Plug, 9P(BLK)			
P902	5122133000	Connector Plug, 9P(WHT)			
U901	5293001100	08-0069			
U902	5293001200	01-0321			
U903	5293001300	01-0322			
U904	5293001400	01-0323			
U905	5293001500	01-0324			
U906	5293001600	07-0054			
U907	5293001700	02-0066			

Parts marked with *require longer delivery time.

JOINT PCB 123 ASSY

REF. NO.	PARTS NO.	DESCRIPTION			
	*5200050200	PCB Assy			
	*5210050200	PCB			
D991	5224013200	Diode	DS135D		
R991	5183038000	Resistor, Carbon	15Ω	5%	1/4W
C991, C992	5172900800	Elec. Cap.	10μF		16V
C993	5173433000	Ceramic Cap.	0.01μF		50V
P991	5122148000	Connector Plug, 5P(WHT)			
P992	5122147000	Connector Plug, 4P(WHT)			
P993	5122150000	Connector Plug, 7P(WHT)			

PHONE AMPL. PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION			
	*5200061501	PCB Assy			
	*5210061500	PCB			
	IC				
U701	5220406800	TA7230P			
	TRANSISTORS				
Q701	5042553000	2SA733P			
Q702, Q703	5145091000	2SC945AK			
Q704	5042553000	2SA733P			
	DIODES				
D701~D703	5224013210	DS135D			
D704~D706	5143118000	1S2473HJ			
	CARBON RESISTORS All resistors are rated ±5% tolerance and 1/4 watt.				
R701, R801	5183132000	120kΩ			
R702, R802	5183100000	5.6kΩ			
R703, R803	5183082000	1kΩ			
R704, R804	5183036000	12Ω			
R706	5183082000	1kΩ			
R707	5180058000	100Ω	1/2W		
R708	5183106000	10kΩ			
R709	5183104000	8.2kΩ			
R710, R711	5183130000	100kΩ			
R712~R717	5183058000	100Ω			
R718, R419	5183106000	10kΩ			
R720, R721	5183122000	47kΩ			
R722	5183114000	22kΩ			
R723	5183110000	15kΩ			
R724	5183130000	100kΩ			
	CAPACITORS				
C701	5260163252	Elec.	22μF	10V	
C702, C802	5260165052	Elec.	47 μF	10V	
C703, C803	5170449000	Mylar	0.1μF	100V	5%
C704, C804	5173072800	Elec.	470μF	16V	
C705	5173072800	Elec.	470μF	16V	

REF. NO.	PARTS NO.	DESCRIPTION			
R420	5183122000	47kΩ			
R421	5183098000	4.7kΩ			
R422	5183130000	100kΩ			
R423	5183074000	470Ω			
R424, R425	5183144000	390kΩ			
R426	5183138000	220kΩ			
R427	5183136000	180kΩ			
R428	5183112000	18kΩ			
R429, R430	5183144000	390kΩ			
R431	5183082000	1kΩ			
R432	5183130000	100kΩ			
R433	5183154000	1MΩ			
R434	5183082000	1kΩ			
R435, R436	5183106000	10kΩ			
R437	5183154000	1MΩ			
R438~R440	5183129000	91kΩ			
R441	5183106000	10kΩ			
R442	5183120000	39kΩ			
R443	5183114000	22kΩ			
R444	5183130000	100kΩ			
R445	5183118000	33kΩ			
R446	5183130000	100kΩ			
R447	5183106000	10kΩ			
R448	5183112000	18kΩ			
R449	5183098000	4.7kΩ			
R450, R451	5183072000	390Ω			
R452	5183122000	47kΩ			
R453	5183146000	470kΩ			
R454	5183122000	47kΩ			
R455	5183146000	470kΩ			
R456	5183130000	100kΩ			
R457	5183106000	10kΩ			
R458	5183130000	100kΩ			
R459	5183114000	22kΩ			
R460~R487	5183090000	2.2kΩ			
R488	5183130000	100kΩ			
R489	5183114000	22kΩ			
R490	5183098000	4.7kΩ			
R491~R493	5183106000	10kΩ			
R494	⚠5184676000	4.7Ω 1W Metal Film, Nonflammable			
	CAPACITORS				
C401	5260165252	Elec.	47μF	25V	
C402	5260162550	Elec.	10μF	16V	
C403~C405	5054330000	Dip. Mica	150pF	50V	10%
C409	5260165252	Elec.	47μF	25V	
C410	5260162650	Elec.	10μF	25V	
C411	5170401000	Mylar	1000pF	100V	5%
C415	5260165252	Elec.	47μF	25V	
C416~C418	5170437000	Mylar	0.033μF	100V	5%
C419	5260162550	Elec.	10μF	16V	
C420	5260160550	Elec.	0.47μF	50V	
C421	5260162550	Elec.	10μF	16V	
C422	5260165252	Elec.	47μF	25V	
C423, C424	5170449000	Mylar	0.1μF	100V	5%
C425	5260162650	Elec.	10μF	25V	
C426	5260163452	Elec.	22μF	16V	
C427	5170401000	Mylar	1000pF	100V	5%
C428	5260165252	Elec.	47μF	16V	
C429	5172336000	Ceramic	0.01μF	50V	20%
C430	5260162550	Elec.	10μF	16V	
C431, C432	5170417000	Mylar	4700pF	100V	5%
C433	5170401000	Mylar	1000pF	100V	5%
	TRIMMER CAPACITORS				
C406~C408	5267205500		85pF-350pF		

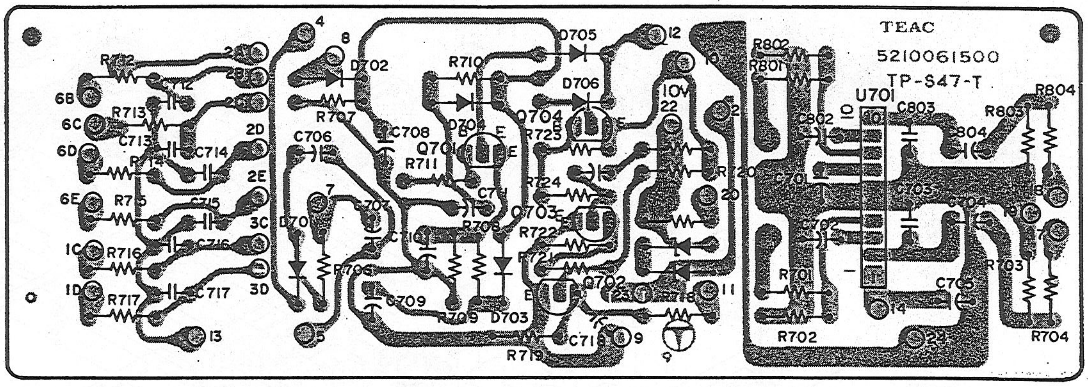
Parts marked with *require longer delivery time.

REF. NO.	PARS NO.	DESCRIPTION
	COILS	
L401~L403	6046640000	Choke 1.2mH
L404	5286013800	Choke 2mH
	MISCELLANEOUS	
K401~K403	5290008900	Relay, G2V-2 24V
P401	5122130000	Connector Plug, 6P(WHT)
P402	5122129000	Connector Plug, 5P(WHT)
P403	5334017500	Connector Socket, 15P
P404	5334017600	Connector Socket, 16P
U401	6046641100	OSC Unit 100kHz

POWER SUPPLY PCB ASSY

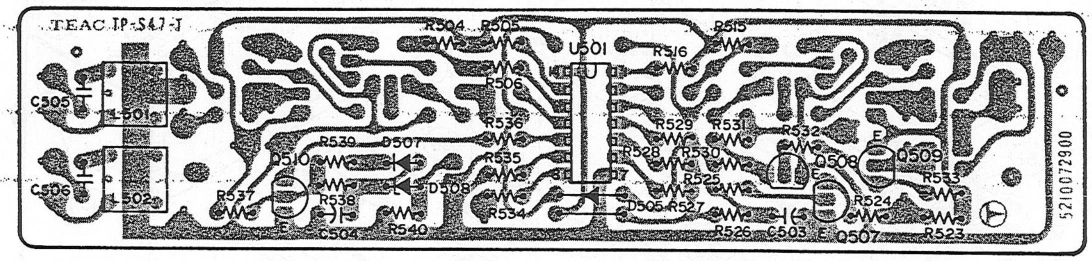
REF. NO.	PARTS NO.	DESCRIPTION
	*5200050808	PCB Assy
	*5210050801	PCB
	IC's	
U911	5220018600	MSN4512RS
U912	5220018700	SN74LS151
U913	5220803100	NPD554C
U914	5220411500	BA6109
U951	5228005000	W02
U952	5228005100	KBPC102
	TRANSISTORS	
Q901, Q903	5042521000	2SC945P
Q905	5042521000	2SC945P
Q906	5230770700	2SC1841E
Q907	5230506100	2SB794L
Q908	5231755500	2SD985
Q909	5230770700	2SC1841E
Q910	5231756200	2SD882Q or P
Q911	5231755500	2SD985
Q912, Q913	5042521000	2SC945P
Q951	⚠5231760100	2SD1022
Q952	⚠5042521000	2SC945P
Q953	5231760100	2SD1022
Q954	5231755500	2SD985
	DIODES	
D901	5224540101	Zener, RD4.7EB3
D906~D910	5224013210	DS135D
D911	5224539901	Zener, RD4.7EB1
D912	5224541901	Zener, RD8.2EB3
D951	⚠5143089000	W03C
D952	5224543501	Zener, RD13EB3
D953, D954	5224542801	Zener, RD11EB2
	CARBON RESISTORS **All resistors are rated ±5% tolernace and 1/4 watt.**	
R901~R903	5183086000	1.5kΩ
R904	5183100000	5.6kΩ
R905	5183090000	2.2kΩ
R906, R908	5183108000	12kΩ
R909	5183090000	2.2kΩ

PHONE AMPL. PCB Assy



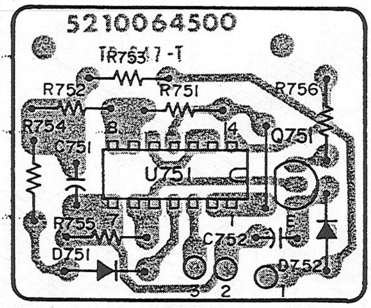
TEAC
5210061500
TP-S47-T
U701
R802
R801
R804
R803
C803
C802
C804
C701
C703
C704
C702
C705
R701
R702
R703
R704
D705
D706
D702
D704
D703
D701
Q704
Q701
Q703
Q702
R710
R707
R711
R708
R705
R709
R723
R724
R722
R721
R720
R718
R719
C706
C707
C708
C709
C710
C711
C718
R712
R713
R714
R715
R716
R717
C712
C713
C714
C715
C716
C717
6B
6C
6D
6E
1C
1D
2D
2E
3C
3D
4
5
7
8
9
10V
11
12
13
14
20
22
23

MUTING PCB Assy



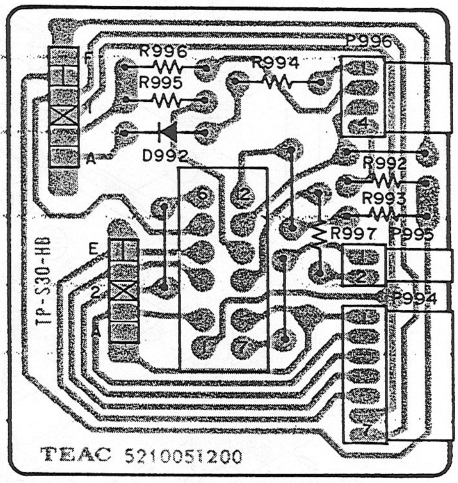
TEAC TP-S47-T
5210072900
U501
C505
C506
L501
L502
C503
C504
R504
R505
R506
R515
R516
R523
R524
R525
R526
R527
R528
R529
R530
R531
R532
R533
R534
R535
R536
R537
R538
R539
R540
D505
D507
D508
Q507
Q508
Q509
Q510

CONTROL PCB Assy



5210064500
TP-S47-T
R751
R752
R753
R754
R755
R756
C751
C752
U751
Q751
D751
D752
1
2
3
4
7
8

REMOTE PCB 111 Assy



TEAC 5210051200
TP-S30-HB
R992
R993
R994
R995
R996
R997
D992
P994
P995
P996
E
A
1
2
6
7
12

REF. NO.	PARTS NO.	DESCRIPTION		
C706	5260166052	Elec.	100μF	16V
C707	5260165952	Elec.	100μF	10V
C708	5172961800	Elec.	470μF	16V
C709	5260166852	Elec.	220μF	10V
C710	5260160750	Elec.	1μF	50V
C711	5260165052	Elec.	47μF	10V
C712~C717	5173435000	Ceramic	0.047μF	50V
C718	5260160750	Elec.	1μF	50V

MUTING PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION		
	*5260072910	PCB Assy		
	*5210072900	PCB		
	IC's			
U501	5220017300	HD14070BP		
	TRANSISTORS			
Q507	5145082000	2SC2060(Q)		
Q508	5145091000	2SC945A(K)		
Q509	5042553000	2SA733(P)		
Q510, Q511	5145091000	2SC945A(K)		
	DIODES			
D505	5143118000	1S2473HJ		
D507	5042517000	1S2473VE		
D508	5042554000	RD6.2EB		
	COILS			
L501, L502	5286010800	Choke, 65 mH; Semi-fixed		
	CAPACITORS			
C503, C504	5172916800	Elec.	33μF	16V
C505, C506	5054744000	Dip. Mica	100pF	50V
	CARBON RESISTORS			
	All resistors are rated ±5% tolerance and 1/4 watt.			
R504~R506	5240172200	47kΩ		
R515~R517	5240172200	47kΩ		
R523	5204170600	10kΩ		
R524	5240165800	100Ω		
R525	5240163400	10Ω		
R526~R530	5240172200	47kΩ		
R531	5240171400	22kΩ		
R532	5240172200	47kΩ		
R533	5240171400	22kΩ		
R534, R535	5240170600	10kΩ		
R536	5240171400	22kΩ		
R537	5240169800	4.7kΩ		
R538	5240172200	47kΩ		
R539	5240165800	100Ω		
R540	5240171400	22kΩ		

Parts marked with *require longer delivery time.

CONTROL PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION			
	*5200064500	PCB Assy			
	*5210064500	PCB			
	IC				
U715	5220013700	MSM4011RS			
	TRANSISTORS				
Q751	5042553000	2SA733(P)			
	DIODES				
D751, D752	5143118000	Silicon, 1S2473HJ			
	CARBON RESISTORS				
R751	5183146000	470kΩ	5%	¼W	
R752	5183082000	1kΩ	5%	¼W	
R753	5183132000	120kΩ	5%	¼W	
R754	5183082000	1kΩ	5%	¼W	
R755, R576	5183106000	10kΩ	5%	¼W	
	CAPACITORS				
C751	5260161150	Elec.	2.2μF	50V	
C752	5260163452	Elec.	22μF	25V	

REMOTE PCB 111 ASSY

REF. NO.	PARTS NO.	DESCRIPTION		
	*5200051200	PCB 111 Assy		
	*5210051200	PCB 111		
	DIODE			
D992	5224013210	DS135D		
	CARBON RESISTORS			
R992	5183084000	1.2kΩ	5%	¼W
R993	5183078000	680Ω	5%	¼W
R994	5183084000	1.2kΩ	5%	¼W
R995	5183078000	680Ω	5%	¼W
R996	5183084000	1.2kΩ	5%	¼W
R997	5183078000	680Ω	5%	¼W
	MISCELLANEOUS			
	5334010100	Connector Socket, 12P		
P994	5122150000	Connector Plug, 7P(WHT)		
P995	5122145000	Connector Plug, 2P(WHT)		
P996	5122147000	Connector Plug, 4P(WHT)		

BALANCE AMPL. PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200126602	PCB Assy
	*5210126602	PCB
	IC's	
U101	5220419600	NJM5532D
U301, U401	~~5220416600~~	~~NJM2041D D~~ 5147028000 NJM4558DD
U501	⚠5220413100	NJM78M15A
U502	⚠5220420500	NJM79M15A
	TRANSISTORS	
Q301, Q401	5145151000	2SC1815GR
Q302, Q402	5145151000	2SC1815GR
Q303, Q403	5145150000	2SA1015GR
Q304, Q404	5145150000	2SA1015GR
Q305, Q405	5230779200	2SC2824Y
Q306, Q406	5230779200	2SC2824Y
Q307, Q407	5230017500	2SA1184Y
Q308, Q408	5230017500	2SA1184Y
	DIODES	
D301～D304	5143118000	1S2473HJ
D401～D404	5143118000	1S2473HJ
D501	⚠5228005000	W02
D502, D503	5042517000	1S2473VE
	RESISTORS **All resistors are rated ±5% tolerance, 1/4W and are carbon type unless otherwise noted.**	
R101, R201	5181477000	620Ω
R102, R202	5181474000	470Ω
R103, R203	5181474000	470Ω
R104, R204	5241150600	10kΩ, Metal Film
R105, R205	5241150600	10kΩ, Metal Film
R106, R206	5241148700	1.6kΩ, Metal Film
R107, R207	5241148700	1.6kΩ, Metal Film
R108, R208	5181458000	100Ω
R109, R209	5181530000	100kΩ
R110, R210	⚠5183566000	33Ω, Nonframmable
R301, R401	5181525000	62kΩ
R302, R402	5181506000	10kΩ
R303, R403	5181506000	10kΩ
R304, R404	5241150600	10kΩ, Metal Film
R305, R405	5241150600	10kΩ, Metal Film
R306, R406	5181498000	4.7kΩ
R307, R407	⚠5183566000	33Ω, Nonframmable
R308, R408	⚠5183566000	33Ω, Nonframmable
R309, R409	5181510000	15kΩ
R310, R410	5181510000	15kΩ
R311, R411	5181510000	15kΩ
R312, R412	5181510000	15kΩ
R313, R413	5181498000	4.7kΩ
R314, R414	5181498000	4.7kΩ
R315, R415	5181498000	4.7kΩ
R316, R416	5181498000	4.7kΩ
R317, R417	5181482000	1kΩ
R318, R418	5181482000	1kΩ
R319, R419	5181482000	1kΩ
R320, R420	5181482000	1kΩ
R321, R421	5181426000	4.7Ω
R322, R422	5181426000	4.7Ω
R323, R423	5181426000	4.7Ω
R324, R424	5181426000	4.7Ω
R325, R425	5181434000	10Ω
R326, R426	5181434000	10Ω

Parts marked with *require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION
	CAPACITORS	
C101, C201	5172212000	Ceramic 100pF 50V 10%
C102, C202	5172212000	Ceramic 100pF 50V 10%
C103, C203	5260163552	Elec. 22μF 35V
C104, C204	5260163552	Elec. 22μF 35V
C105, C205	5172212000	Ceramic 100pF 50V 10%
C106, C206	5172212000	Ceramic 100pF 50V 10%
C107, C207	5260163552	Elec. 22μF 35V
C108, C208	5260163552	Elec. 22μF 35V
C301, C401	5260162650	Elec. 10μF 25V
C302, C402	5172204000	Ceramic 22pF 50V 10%
C303, C403	5172212000	Ceramic 100pF 50V 10%
C304, C404	5260162650	Elec. 10μF 25V
C305, C405	5260162650	Elec. 10μF 25V
C306, C406	5172211000	Ceramic 82pF 50V 10%
C307, C407	5260163452	Elec. 22μF 25V
C308, C408	5260163452	Elec. 22μF 25V
C309, C409	5260065600	Elec. 1μF 50V
C310, C410	5260065600	Elec. 1μF 50V
C311, C411	5172236000	Ceramic 0.01μF 50V 20%
C312, C412	5172236000	Ceramic 0.01μF 50V 20%
C313, C413	5172236000	Ceramic 0.01μF 50V 20%
C314, C414	5172236000	Ceramic 0.01μF 50V 20%
C315, C415	5172236000	Ceramic 0.01μF 50V 20%
C316, C416	5172236000	Ceramic 0.01μF 50V 20%
C501	⚠5263164500	Metalized 0.047μF 250V 10%
C502, C503	⚠5173064000	Elec. 330μF 25V
C504, C505	5172236000	Ceramic 0.01μF 50V 20%
C506, C507	⚠5260163552	Elec. 22μF 35V
C508, C509	5172236000	Ceramic 0.01μF 50V 20%
	MISCELLANEOUS	
P101	5122130000	Plug, Connector; 6P (WHT)
P102	5122127000	Plug, Connector; 3P (WHT)
P301, P401	5122126000	Plug, Connector; 2P (WHT)
P302, P402	5122127000	Plug, Connector; 3P (WHT)
P501～P503	5336104100	Socket, Connector; 1P

SW. PCB 174 ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200051300	PCB 174 Assy
	*5210051300	PCB 174
D1	5225007700	LED, LN311GP
D2, D3	5225007600	LED, LN211RP
S1～S6	5302100700	Switch, Tact

SW. PCB 175 ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200048800	PCB 175 Assy
	*5210048800	PCB 175
S991	5301203300	Switch, Rotary; 2-3

SW. PCB 176 ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200048900	PCB 176 Assy
	*5210048900	PCB 176
S992	5301203400	Switch, Rotary; 2-4

SW. PCB 177 ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200049000	PCB 177 Assy
	*5210049000	PCB 177
S12	6051083000	Switch, Tact

Parts marked with *require longer delivery time.

PHONES JACK PCB 102 ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200049200	PCB 102 Assy
	*5210049200	PCB 102
J12	5330007800	Jack, Phones

COUNTER PCB 103 ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200051500	PCB 103 Assy
	*5210051500	PCB 103
	5225007500	LED, SL1032
	6051083000	Switch, Tact

MIC JACK 109 ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200049100	PCB 109 Assy
	*5210049100	PCB 109
J11, J21	5330007700	Jack, Mic

LAMP PCB 109 ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200051100	PCB 109 Assy
	*5210051100	PCB 109
	5310005500	Lamp, 0.07A 6.3V

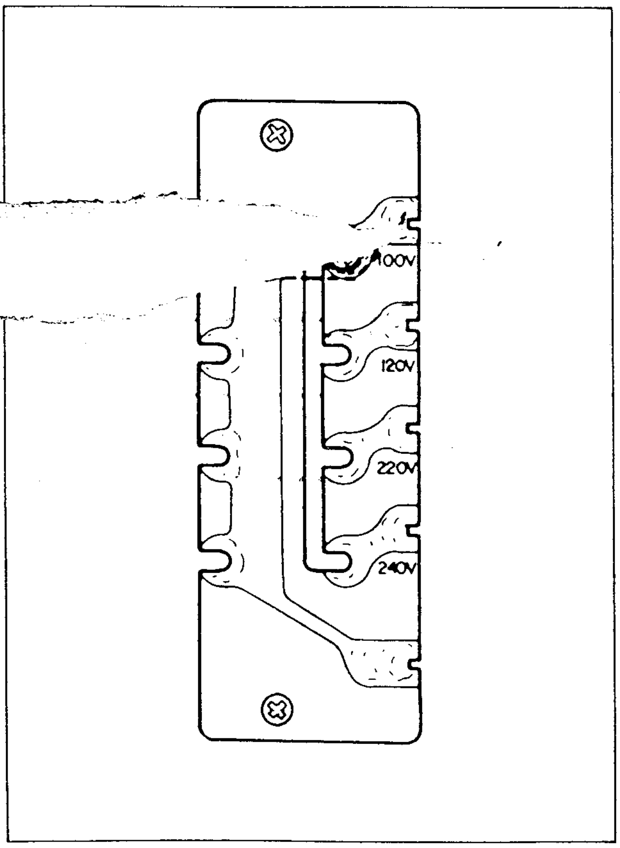
Voltage Conversion and Note for U.K. Customers

General Export Model Only:

If it is necessary to alter the AC power setting to suit the line voltage in your area, use the following procedures.

ALWAYS DISCONNECT THE POWER LINE CORD BEFORE MAKING THESE ADJUSTMENTS!

1. Remove the top cover of the deck by removing the screws from the sides.
2. Locate the voltage selector, shown in the illustration, to the front of the power transformer.
3. Loosen the two screws in the shorting bar and move the bar so that it shorts across the terminals marked with the required voltage (100, 120, 220 or 240).
4. Retighten the screws.
5. Replace the top cover.



U.K. Customers Only:

Due to the variety of plugs being used in the U.K., this unit is sold without an AC plug. Please request your dealer to install the correct plug to match the mains power outlet where your unit will be used as per these instructions.

IMPORTANT

The wires in this mains lead are coloured in accordance with the following code:

BLUE:	**NEUTRAL**
BROWN:	**LIVE**

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows.

The wire which is coloured BLUE must be connected to the terminal which is marked with the letter N or coloured BLACK. The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

SENSOR PCB 110 ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200052000	PCB 110 Assy
	*5210052000	PCB 110
PH1, PH2	5228005500	Photo Sensor

VOLTAGE SELECTOR PCB ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	*5168548100	PCB Assy [GE]
	*5167548101	PCB [GE]
	5555062000	Plate, Voltage Selector
	5780163008	Screw, PSC; M3 x 8

FUSE PCB ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200132100	PCB Assy [E, UK, A]
	*5210132100	PCB [E, UK, A]
C1	5263164500	Capacitor, Metalaized 0.047μF 250V
F1 ~ F4	5142188000	Fuse, T1.6A 250V
F5	5041138000	Fuse, T500mA 250V
F6, F7	5142183000	Fuse, T315mA 250V
	5142087000	Holder, Fuse

SW. PCB 173 ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200048700	PCB 173 Assy
	*5210048700	PCB 173
S11	5301203200	Switch, Rotary; 2-2

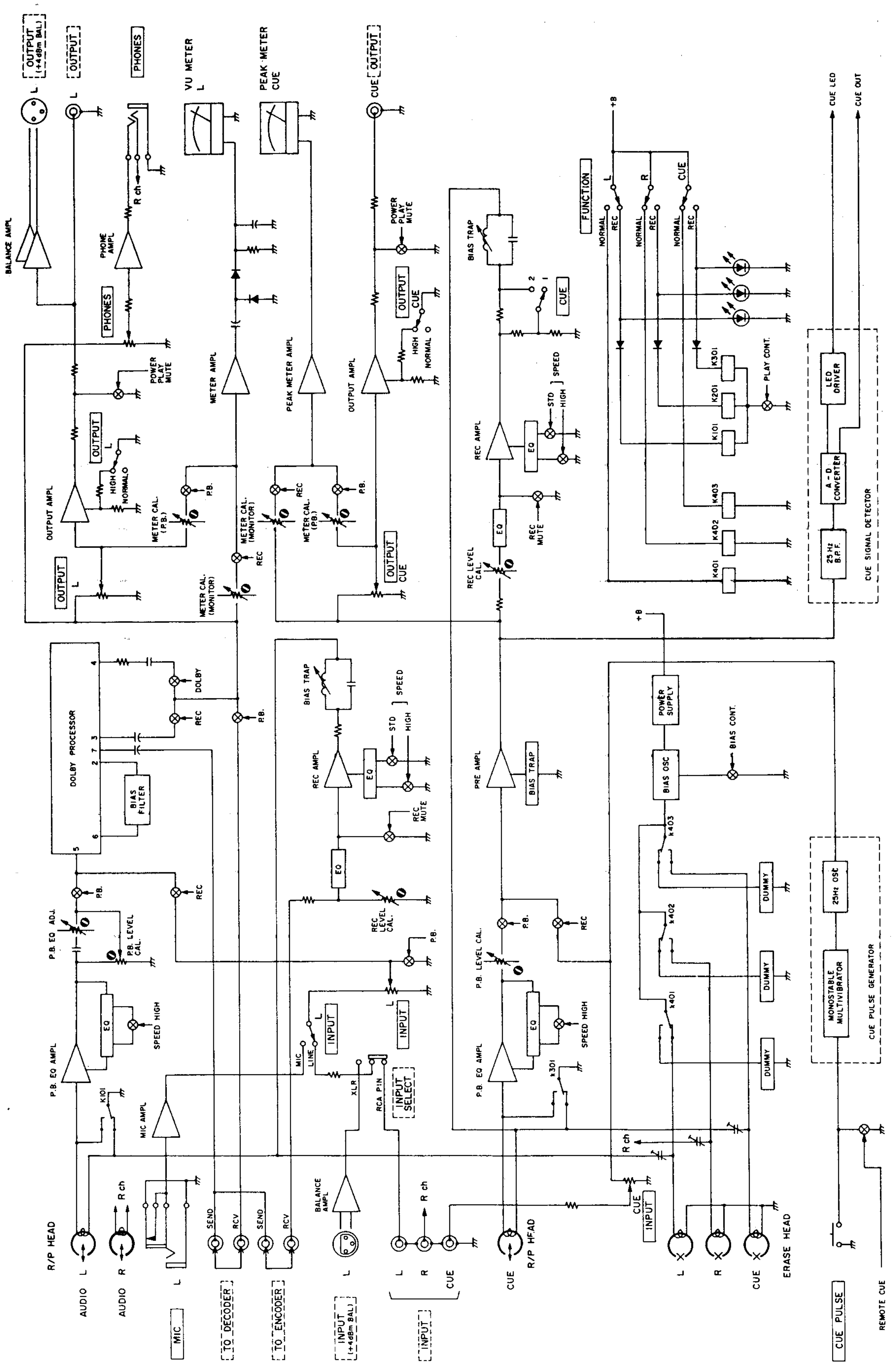
LED PCB 145 ASSY (PC Board Omitted)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200051700	PCB 145 Assy
	*5210051700	PCB 145
D11, D21	5225007800	LED, LN217RP
D31	5225007800	LED, LN217RP

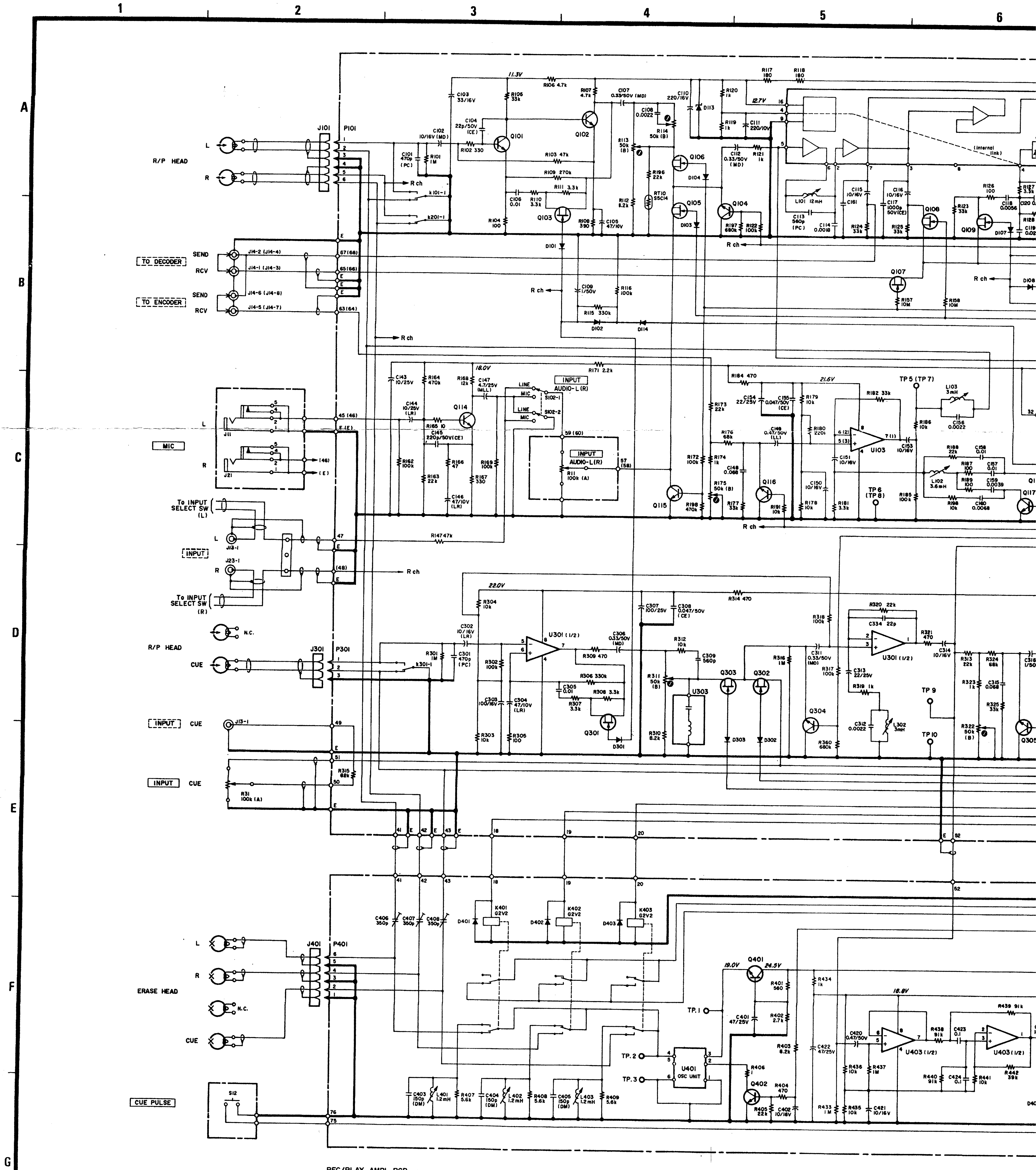
Parts marked with *require longer delivery time.

[U] : U.S.A.
[A] : AUSTRALIA
[C] : CANAD
[E] : EUROPE
[GE] : GENERAL EXPORT
[UK] : U.K.

9. BLOCK DIAGRAM


OUTPUT (+4dBm BAL)
OUTPUT
PHONES
VU METER
PEAK METER CUE
CUE OUTPUT
BALANCE AMPL
PHONE AMPL
POWER PLAY MUTE
METER AMPL
PEAK METER AMPL
OUTPUT AMPL
BIAS TRAP
FUNCTION
NORMAL
REC
CUE
CUE LED
CUE OUT
LED DRIVER
A-D CONVERTER
25 Hz B.P.F.
CUE SIGNAL DETECTOR
PLAY CONT.
K101
K201
K301
K401
K402
K403
REC AMPL
EQ
REC MUTE
REC LEVEL CAL.
METER CAL. (P.B.)
METER CAL. (MONITOR)
SPEED
STD
HIGH
DOLBY PROCESSOR
BIAS FILTER
DOLBY
P.B.
POWER SUPPLY
BIAS OSC
BIAS CONT.
PRE AMPL
DUMMY
25Hz OSC
MONOSTABLE MULTIVIBRATOR
CUE PULSE GENERATOR
P.B. EQ ADJ.
P.B. LEVEL CAL.
P.B. EQ AMPL
MIC AMPL
MIC
LINE
INPUT
XLR
RCA PIN
INPUT SELECT
R/P HEAD
AUDIO
R ch
SEND
RCV
TO DECODER
TO ENCODER
BALANCE AMPL
INPUT (+4dBm BAL)
ERASE HEAD
CUE PULSE
REMOTE CUE
+B

TASCAM TEAC Production Products **133-B** SCHEMATIC DIAGRAM (AMPLIFIER)


1
2
3
4
5
6
A
B
C
D
E
F
G
R/P HEAD
J101
P101
TO DECODER
SEND
RCV
TO ENCODER
SEND
RCV
MIC
J11
J21
To INPUT SELECT SW (L)
INPUT
J13-1
J23-1
To INPUT SELECT SW (R)
N.C.
R/P HEAD
CUE
J301
P301
INPUT CUE
J13-1
R31 100k (A)
R315 62k
ERASE HEAD
J401
P401
CUE
CUE PULSE
S12
INPUT AUDIO-L(R)
R11 100k (A)
U103
U301 (1/2)
U303
U401 OSC UNIT
U403 (1/2)
TP.1
TP.2
TP.3
TP 5 (TP 7)
TP 6 (TP 8)
TP 9
TP 10
K401 G2V2
K402 G2V2
K403 G2V2
Q401
Q402
11.3V
12.7V
18.0V
21.6V
22.0V
19.0V
24.5V
18.8V
R ch
(Internal link)

REC/PLAY AMPL PCB ( ): Rch

U101 (U201)	NE646B
U102	TA75558P
U103	TA75558P
U301	TL4558P
U302	TA75558P

Q101 (Q201)	2SC1844(F)
Q102 (Q202)	2SC1327(F)
Q103 (Q203)	2SK117(GR)
Q104 (Q204)	2SD655(E)
Q105 (Q205)	2SK117(GR)
Q106 (Q206)	2SK117(GR)
Q107 (Q207)	2SK117(GR)
Q108 (Q208)	2SK117(GR)
Q109 (Q209)	2SK117(GR)
Q110 (Q210)	2SC2878(B)

Q111 (Q211)	2SK117(GR)
Q112 (Q212)	2SK117(GR)
Q113 (Q213)	2SK68AM1
Q114 (Q214)	2SC1844(F)
Q115 (Q215)	LC945(K)
Q116 (Q216)	2SD655(E)
Q117 (Q217)	LC945(K)
Q118 (Q218)	LC945(K)

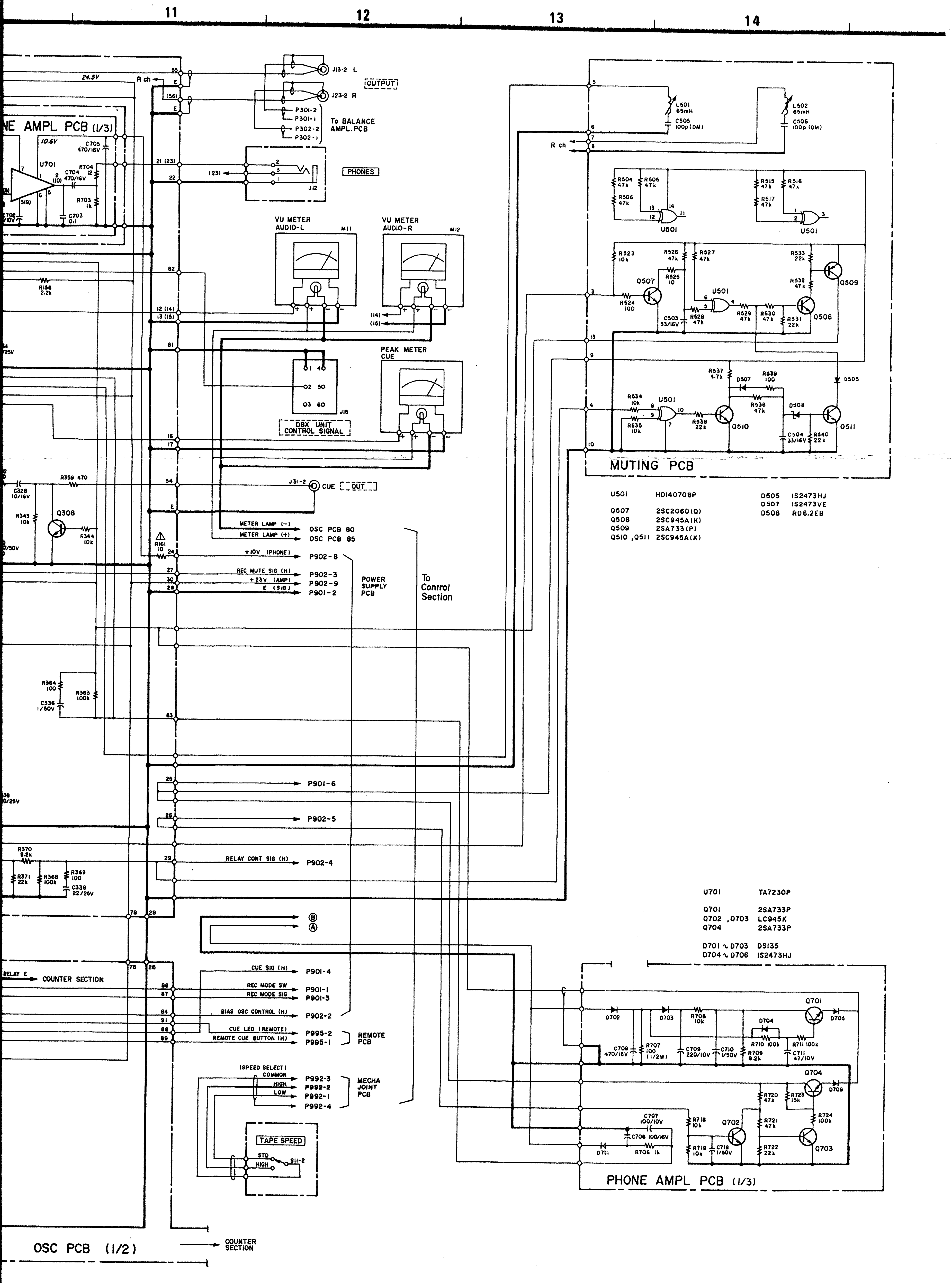
Q301 ∿ Q303	2SK117(GR)
Q304, Q305	2SD655(E)
Q306, Q307	LC945(K)
Q308	2SC2878(B)
Q309 ∿ Q310	2SK68AM
Q311	2SK68AM1
Q312	2SC1637(I)
Q313	(Not used)
Q314	2SC2060(Q)

D101 ∿ D112 (D201 ∿ D212)	IS2473
D113 (D213)	RD13EB3
D114 (−)	IS2473
D301 ∿ D307	IS2473
D308 ∿ D313	DS135

(D105, D106, D202, D205, D206, D208 : Not used)

OSC PCB (1/2)

U401	OSC UNIT
U402, U403	TA75558P
Q401, Q402	2SC2060(Q)
Q403 ∿ Q405	LC945(K)
Q406	2SA733(P)
Q407	LC945(K)
Q408	2SA733(P)
Q409, Q410	LC945(K)


11
12
13
14
OUTPUT
J13-2 L
J23-2 R
To BALANCE AMPL. PCB
PHONES
J12
PHONE AMPL PCB (1/3)
U701
VU METER AUDIO-L M11
VU METER AUDIO-R M12
PEAK METER CUE
DBX UNIT CONTROL SIGNAL
J15
CUE OUT
J31-2
METER LAMP (-) OSC PCB 80
METER LAMP (+) OSC PCB 85
+10V (PHONE) P902-8
REC MUTE SIG (H) P902-3
+23V (AMP) P902-9
E (SIG) P901-2
POWER SUPPLY PCB
To Control Section
P901-6
P902-5
RELAY CONT SIG (H) P902-4
RELAY E COUNTER SECTION
CUE SIG (H) P901-4
REC MODE SW P901-1
REC MODE SIG P901-3
BIAS OSC CONTROL (H) P902-2
CUE LED (REMOTE) P995-2
REMOTE CUE BUTTON (H) P995-1
REMOTE PCB
(SPEED SELECT)
COMMON P992-3
HIGH P992-2
LOW P992-1
P992-4
MECHA JOINT PCB
TAPE SPEED
STD
HIGH
S11-2
OSC PCB (1/2)
COUNTER SECTION
MUTING PCB
U501 HD14070BP
Q507 2SC2060(Q)
Q508 2SC945A(K)
Q509 2SA733(P)
Q510, Q511 2SC945A(K)
D505 1S2473HJ
D507 1S2473VE
D508 RD6.2EB
U701 TA7230P
Q701 2SA733P
Q702, Q703 LC945K
Q704 2SA733P
D701 ~ D703 DS135
D704 ~ D706 1S2473HJ
PHONE AMPL PCB (1/3)

herwise.

rads).

components.

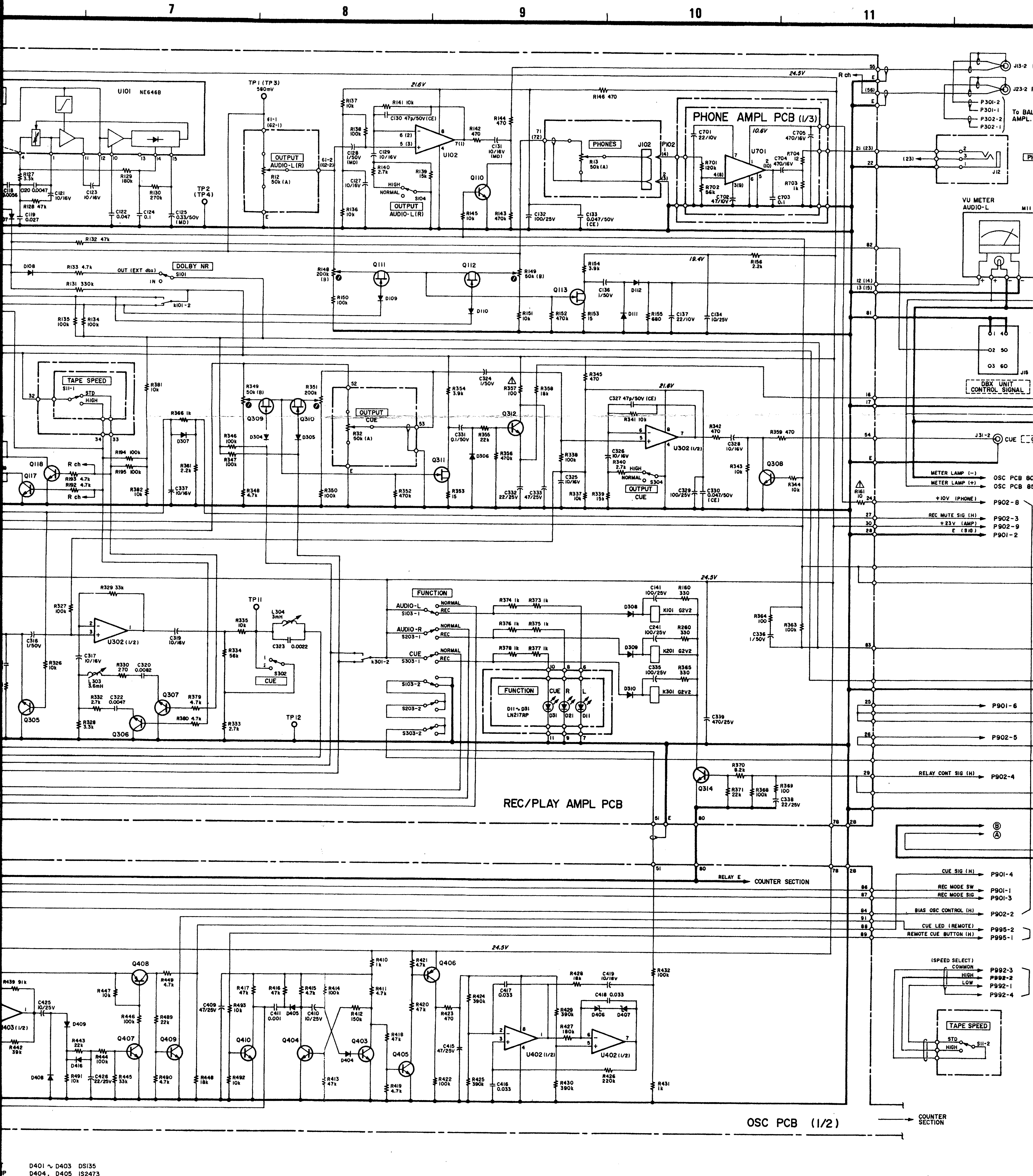
onents – refer to

4. ▭ : front panel indication
5. ⬚ : rear panel indication
6. DC voltages are reference values.
   DC voltage measurement conditions
   - Measure with DC volt meter
   - Mode REC/PAUSE

TASCAM
TEAC Production Products

133-B
MULTI-IMAGE STEREO PLUS CUE CASSETTE RECORDER-REPRODUCER

November, 198


7
8
9
10
11
U101 NE646B
TP1 (TP3)
580mV
21.6V
24.5V
R ch
OUTPUT
AUDIO-L (R)
R12
50k (A)
R137 10k
R141 10k
C130 47p/50V (CE)
U102
Q110
R146 470
PHONES
J102
P102
R13
50k (A)
PHONE AMPL PCB (1/3)
10.6V
C701 22/10V
C705 470/16V
U701
R701 120k
R702 56k
C702 47/10V
C703 0.1
C704 470/16V
R704 12
R703 1k
J13-2
J23-2
P301-2
P301-1
P302-2
P302-1
To BAL
AMPL.
J12
VU METER
AUDIO-L
M11
TP2
(TP4)
R132 47k
D108
R133 4.7k
OUT (EXT dbx)
IN
DOLBY NR
S101
R131 330k
K101-2
R135 100k
R134 100k
R148 200k (B)
Q111
Q112
R149 50k (B)
R150 100k
D109
D110
Q113
19.4V
R154 3.9k
R156 2.2k
C136 1/50V
D112
D111
R151 10k
R152 470k
R153 15
R155 680
C137 22/10V
C134 10/25V
DBX UNIT
CONTROL SIGNAL
J15
TAPE SPEED
S11-1
STD
HIGH
R381 10k
R366 1k
D307
R361 2.2k
C337 10/16V
Q118
Q117
R ch
R194 100k
R195 100k
R193 4.7k
R192 4.7k
R382 10k
R349 50k (B)
R351 200k
Q309
Q310
D304
D305
R346 100k
R347 100k
R348 4.7k
OUTPUT
CUE
R32
50k (A)
Q311
R350 100k
R352 470k
R353 15
C324 1/50V
R354 3.9k
R357 100
R358 18k
Q312
C331 0.1/50V
R355 22k
D306
R356 470k
C332 22/25V
C333 47/25V
R345 470
21.6V
C327 47p/50V (CE)
R341 10k
C326 10/16V
R340 2.7k
HIGH
NORMAL
S304
OUTPUT
CUE
U302 (1/2)
R342 470
C328 10/16V
R359 470
R343 10k
Q308
R344 10k
R338 100k
C325 10/16V
R337 10k
R339 15k
C329 100/25V
C330 0.047/50V (CE)
J31-2
CUE
METER LAMP (−)
METER LAMP (+)
OSC PCB
R161 10
+10V (PHONE)
P902-8
REC MUTE SIG (H)
P902-3
+23V (AMP)
P902-9
E (S10)
P901-2
R329 33k
R327 100k
U302 (1/2)
C316 1/50V
C319 10/16V
R326 10k
C317 10/16V
R330 270
C320 0.0082
L303 3.6mH
R332 2.7k
C322 0.0047
Q307
R379 4.7k
R380 4.7k
R328 3.3k
Q305
Q306
TP11
R335 10k
L304 3mH
C323 0.0022
R334 56k
S302
CUE
R333 2.7k
TP12
FUNCTION
AUDIO-L
S103-1
NORMAL
REC
AUDIO-R
S203-1
CUE
S303-1
K301-2
S103-2
S203-2
S303-2
R374 1k
R373 1k
R376 1k
R375 1k
R378 1k
R377 1k
FUNCTION
CUE R L
D11 ~ D31
LN217RP
D31 D21 D11
24.5V
C141 100/25V
R160 330
D308
K101 G2V2
C241 100/25V
R260 330
D309
K201 G2V2
C335 100/25V
R365 330
D310
K301 G2V2
C339 470/25V
R364 100
C336 1/50V
R363 100k
P901-6
P902-5
Q314
R370 8.2k
R371 22k
R368 100k
R369 100
C338 22/25V
RELAY CONT SIG (H)
P902-4
REC/PLAY AMPL PCB
RELAY E
COUNTER SECTION
CUE SIG (H)
P901-4
REC MODE SW
P901-1
REC MODE SIG
P901-3
BIAS OSC CONTROL (H)
P902-2
CUE LED (REMOTE)
P995-2
REMOTE CUE BUTTON (H)
P995-1
(SPEED SELECT)
COMMON
HIGH
LOW
P992-3
P992-2
P992-1
P992-4
TAPE SPEED
STD
HIGH
S11-2
24.5V
Q408
R449 4.7k
R447 10k
R446 100k
R489 22k
Q407
Q409
C425 10/25V
D409
R443 22k
D416
R444 100k
R491 10k
C426 22/25V
R445 33k
R490 4.7k
R448 18k
D408
R439 91k
U403 (1/2)
R442 39k
C409 47/25V
R493 10k
R417 47k
R416 47k
R415 4.7k
R414 100k
C411 0.001
D405
C410 10/25V
R412 150k
R411 4.7k
R410 1k
R421 4.7k
Q406
Q410
R492 10k
Q404
Q403
D404
R413 47k
R418 47k
R420 47k
Q405
R419 4.7k
R423 470
C415 47/25V
R422 100k
R424 390k
C417 0.033
R425 390k
C416 0.033
U402 (1/2)
R428 18k
C419 10/16V
C418 0.033
R429 390k
D406
D407
R427 180k
R430 390k
R426 220k
U402 (1/2)
R432 100k
R431 1k
OSC PCB (1/2)
COUNTER SECTION

D401 ~ D403	DS135
D404, D405	IS2473
D406, D407	EQA01-06S
D408, D409	IS2473
D416	IS2473

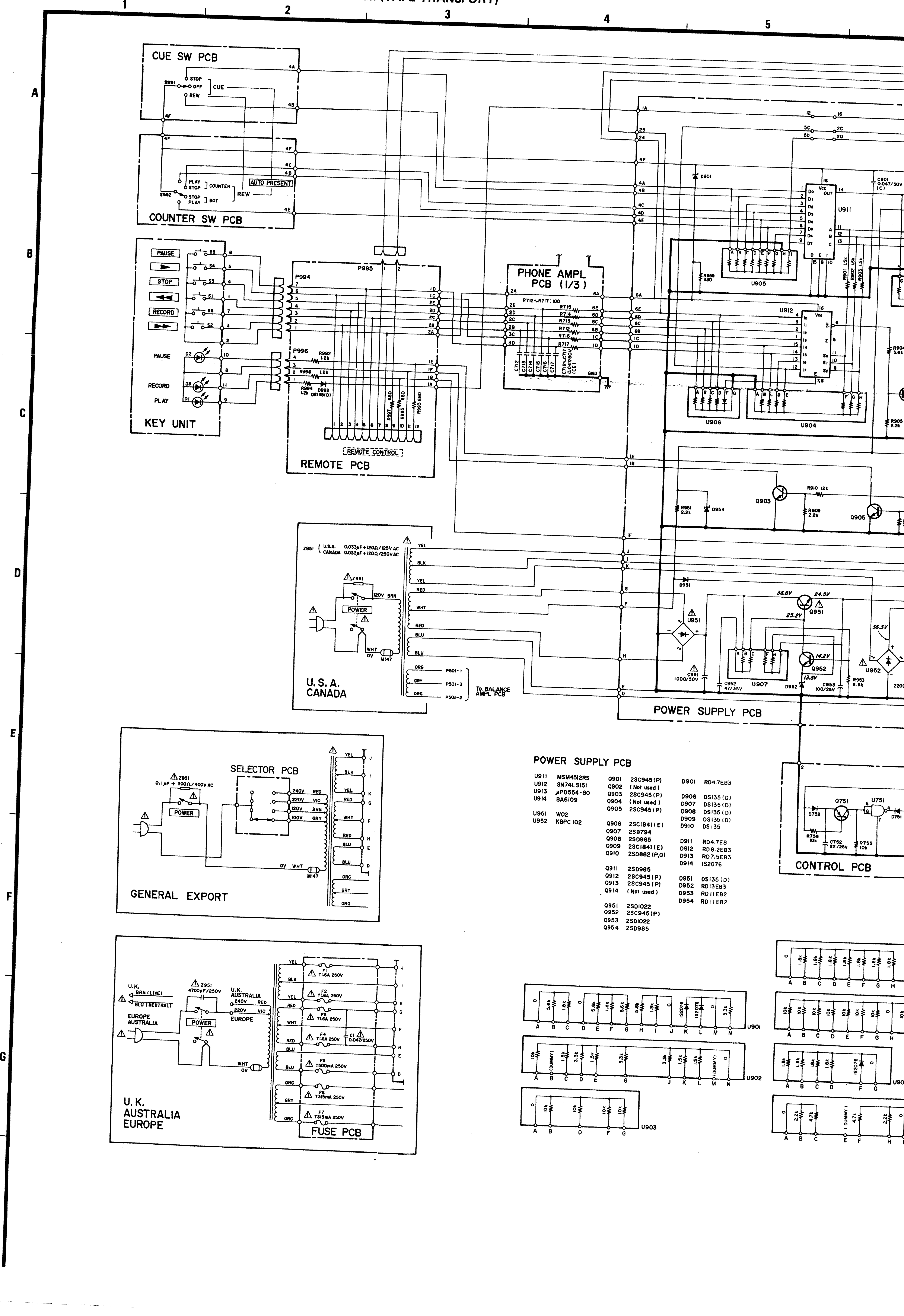
INSTRUCTIONS FOR SERVICE PERSONNEL

BEFORE RETURNING APPLIANCE TO THE CUSTOMER, MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT.

NOTES

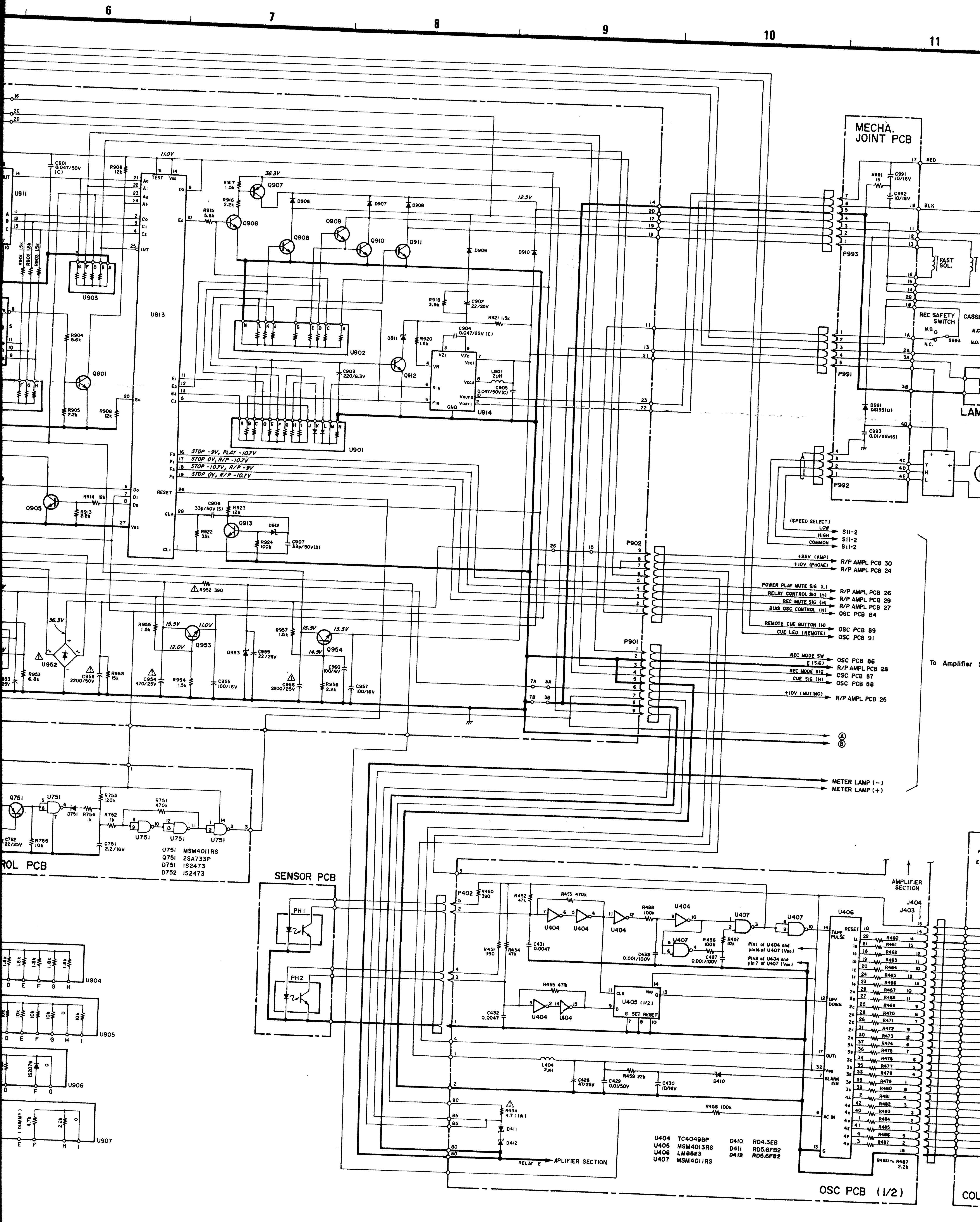
1. All resistors are 1/4 watt, ±5 %, unless marked otherwise. Resistor values are in ohms (k = 1,000 ohms).
2. All capacitor values are in microfarads (p = picofarads).
3. ⚠ Parts marked with this sign are safety critical components. They must alway be replaced with identical components – refer to the TEAC parts list and ensure exact replacement.
4. ▭ : front panel indication
5. ⬚ : rear panel indication
6. DC voltages are reference values. DC voltage measurement conditions
   - Measure with DC volt meter
   - Mode REC/PAUSE

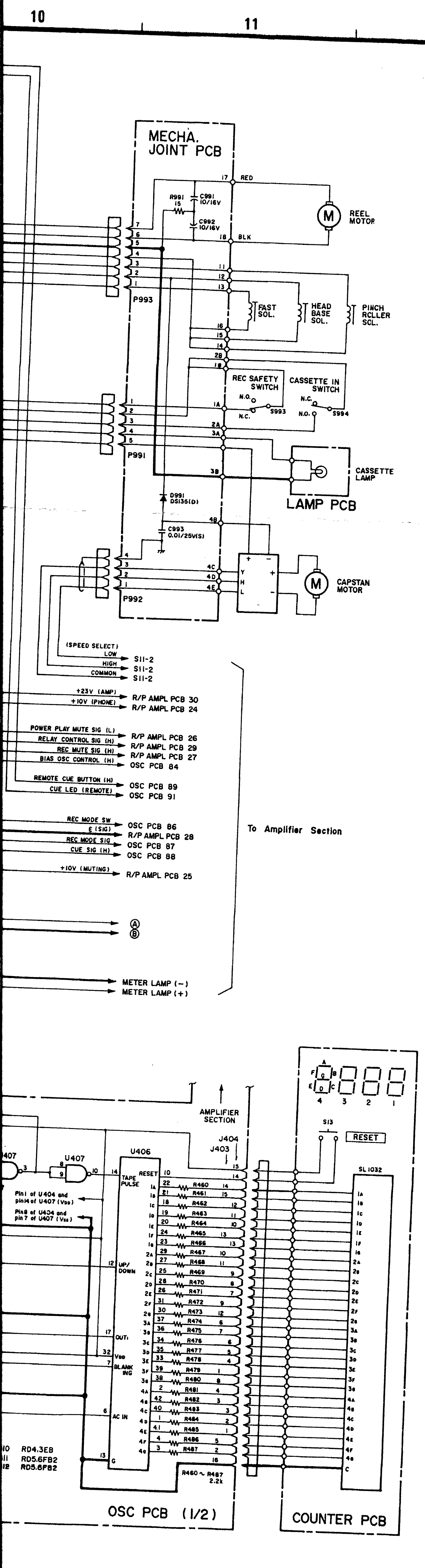
TASCAM TEAC Production Products **133-B** SCHEMATIC DIAGRAM (TAPE TRANSPORT)


1
2
3
4
5
A
B
C
D
E
F
G
H
CUE SW PCB
S991
STOP
OFF
REW
CUE
4A
4B
4F
4C
4D
4E
PLAY
STOP
COUNTER
S992
STOP
PLAY
BOT
REW
AUTO PRESENT
COUNTER SW PCB
PAUSE
STOP
RECORD
S5
S4
S3
S1
S6
S2
D2
D3
D1
KEY UNIT
P994
P995
P996
R992 1.2k
R996 1.2k
R994 1.2k
D992 DS135(D)
R997 680
R995 680
R993 680
REMOTE CONTROL
REMOTE PCB
PHONE AMPL PCB (1/3)
R712~R717: 100
R715
R714
R713
R712
R716
R717
C712
C713
C714
C715
C716
C717
C712~C717 0.047/50V (CE)
GND
D901
R950 330
U905
U911
Vcc
OUT
C901 0.047/50V (C)
U912
U906
U904
R901 1.5k
R902 1.5k
R903 1.5k
R904 6.8k
R905 2.2k
Q903
R910 12k
R909 2.2k
R951 2.2k
D954
Q905
Z951 (U.S.A. 0.033μF+120Ω/125V AC CANADA 0.033μF+120Ω/250V AC
POWER
120V
BRN
YEL
BLK
RED
WHT
BLU
ORG
GRY
WHT 0V
M147
P501-1
P501-3
P501-2
To BALANCE AMPL PCB
U.S.A. CANADA
D951
U951
C951 1000/50V
C952 47/35V
U907
D952
36.6V
24.5V
25.2V
Q951
14.2V
13.6V
Q952
C953 100/25V
R953 6.8k
36.3V
U952
POWER SUPPLY PCB
Z961 0.1μF + 300Ω/400V AC
SELECTOR PCB
240V
220V
120V
100V
VIO
GENERAL EXPORT
CONTROL PCB
D752
Q751
U751
D751
R756 10k
C752 22/25V
R755 10k
U.K. BRN (LIVE)
BLU (NEUTRAL)
EUROPE AUSTRALIA
Z951 4700pF/250V
U.K. AUSTRALIA 240V
220V EUROPE
F1 T1.6A 250V
F2 T1.6A 250V
F3 T1.6A 250V
F4 T1.6A 250V
C1 0.047/250V
F5 T500mA 250V
F6 T315mA 250V
F7 T315mA 250V
FUSE PCB
U.K. AUSTRALIA EUROPE
U901
U902
U903
5.6k
1.8k
3.3k
10k
1.5k
IS2076
(DUMMY)
2.2k
4.7k

POWER SUPPLY PCB

U911	MSM4512RS
U912	SN74LS151
U913	μPD554-80
U914	BA6109
U951	W02
U952	KBPC 102
Q901	2SC945(P)
Q902	(Not used)
Q903	2SC945(P)
Q904	(Not used)
Q905	2SC945(P)
Q906	2SC1841(E)
Q907	2SB794
Q908	2SD985
Q909	2SC1841(E)
Q910	2SD882(P,Q)
Q911	2SD985
Q912	2SC945(P)
Q913	2SC945(P)
Q914	(Not used)
Q951	2SD1022
Q952	2SC945(P)
Q953	2SD1022
Q954	2SD985
D901	RD4.7EB3
D906	DS135(D)
D907	DS135(D)
D908	DS135(D)
D909	DS135(D)
D910	DS135
D911	RD4.7EB
D912	RD8.2EB3
D913	RD7.5EB3
D914	IS2076
D951	DS135(D)
D952	RD13EB3
D953	RD11EB2
D954	RD11EB2


6
7
8
9
10
11
MECHA. JOINT PCB
U911
U913
U903
U902
U901
U914
Q901
Q905
Q906
Q907
Q908
Q909
Q910
Q911
Q912
Q913
11.0V
36.3V
12.5V
STOP -9V, PLAY -10.7V
STOP 0V, R/P -10.7V
STOP -10.7V, R/P -9V
STOP 0V, R/P -10.7V
RESET
TEST
R901 1.5k
R902 1.5k
R903 1.5k
R904 5.6k
R905 2.2k
R906 12k
R908 12k
R913 2.2k
R914 12k
R915 5.6k
R916 2.2k
R917 1.5k
R918 3.9k
R920 1.5k
R921 1.5k
R922 33k
R923 12k
R924 100k
C901 0.047/50V (C)
C902 22/25V
C903 220/6.3V
C904 0.047/25V (C)
C905 0.047/50V (C)
C906 33p/50V (S)
C907 33p/50V (S)
L901 2μH
D906
D907
D908
D909
D910
D911
D912
P993
P991
P992
P902
P901
RED
BLK
FAST SOL.
REC SAFETY SWITCH
S993
CASS
LAM
R991 15
C991 10/16V
C992 10/16V
D991 DS135(D)
C993 0.01/25V(S)
(SPEED SELECT)
LOW
HIGH
COMMON
S11-2
S11-2
S11-2
+23V (AMP)
+10V (PHONE)
R/P AMPL PCB 30
R/P AMPL PCB 24
POWER PLAY MUTE SIG (L)
RELAY CONTROL SIG (H)
REC MUTE SIG (H)
BIAS OSC CONTROL (H)
R/P AMPL PCB 26
R/P AMPL PCB 29
R/P AMPL PCB 27
OSC PCB 84
REMOTE CUE BUTTON (H)
CUE LED (REMOTE)
OSC PCB 89
OSC PCB 91
REC MODE SW
E (SIG)
REC MODE SIG
CUE SIG (H)
OSC PCB 86
R/P AMPL PCB 28
OSC PCB 87
OSC PCB 88
+10V (MUTING)
R/P AMPL PCB 25
To Amplifier
Ⓐ
Ⓑ
METER LAMP (−)
METER LAMP (+)
U952
Q953
Q954
15.5V
11.0V
12.0V
16.5V
13.5V
14.5V
R952 390
R953 6.8k
R954 1.5k
R955 1.5k
R956 2.2k
R957 1.5k
R958 15k
C954 470/25V
C955 100/16V
C956 2200/25V
C957 100/16V
C958 2200/50V
C959 22/25V
C960 100/16V
D953
Q751
U751
D751
R751 470k
R752 1k
R753 120k
R754 1k
R755 10k
C751 2.2/16V
C752 22/25V
U751 MSM4011RS
Q751 2SA733P
D751 1S2473
D752 1S2473
ROL PCB
U904
U905
U906
U907
1S2076
(DUMMY)
4.7k
2.2k
SENSOR PCB
PH1
PH2
P402
R450 390
R451 390
R452 47k
R453 470k
R454 47k
R455 47k
R456 100k
R457 10k
R458 100k
R459 22k
R488 100k
R494 4.7 (1W)
C427 0.001/100V
C428 47/25V
C429 0.01/50V
C430 10/16V
C431 0.0047
C432 0.0047
C433 0.001/100V
L404 2μH
D410
D411
D412
U404
U405 (1/2)
U406
U407
CLK
SET RESET
TAPE PULSE
UP/DOWN
OUT
BLANKING
AC IN
Pin1 of U404 and pin14 of U407 (VDD)
Pin8 of U404 and pin7 of U407 (VSS)
AMPLIFIER SECTION
J404
J403
R460
R461
R462
R463
R464
R465
R466
R467
R468
R469
R470
R471
R472
R473
R474
R475
R476
R477
R478
R479
R480
R481
R482
R483
R484
R485
R486
R487
R460 ~ R487 2.2k
RELAY E
APLIFIER SECTION
U404 TC4049BP
U405 MSM4013RS
U406 LM8523
U407 MSM4011RS
D410 RD4.3EB
D411 RD5.6FB2
D412 RD5.6FB2
OSC PCB (1/2)
COU


10
11
12
13
14
MECHA. JOINT PCB
RED
BLK
R991 15
C991 10/16V
C992 10/16V
REEL MOTOR
P993
FAST SOL.
HEAD BASE SOL.
PINCH RCLLER SCL.
REC SAFETY SWITCH
N.O.
N.C.
S993
CASSETTE IN SWITCH
S994
P991
CASSETTE LAMP
LAMP PCB
D991 DS135(D)
C993 0.01/25V(S)
P992
CAPSTAN MOTOR
(SPEED SELECT)
LOW
HIGH
COMMON
S11-2
S11-2
S11-2
+23V (AMP)
+10V (PHONE)
R/P AMPL PCB 30
R/P AMPL PCB 24
POWER PLAY MUTE SIG (L)
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OSC PCB 91
REC MODE SW
E (SIG)
REC MODE SIG
CUE SIG (H)
OSC PCB 86
R/P AMPL PCB 28
OSC PCB 87
OSC PCB 88
+10V (MUTING)
R/P AMPL PCB 25
To Amplifier Section
Ⓐ
Ⓑ
METER LAMP (−)
METER LAMP (+)
AMPLIFIER SECTION
J404
J403
U406
U407
RESET
TAPE PULSE
UP/DOWN
OUT1
VDD
BLANKING
AC IN
G
Pin1 of U404 and pin14 of U407 (VDD)
Pin8 of U404 and pin7 of U407 (VSS)
R460 ~ R487 2.2k
RD4.3EB
RD5.6FB2
RD5.6FB2
S13
RESET
SL1032
OSC PCB (1/2)
COUNTER PCB

INSTRUCTIONS FOR SERVICE PERSONNEL

BEFORE RETURNING APPLIANCE TO THE CUSTOMER, MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT.

NOTES

1. All resistors are 1/4 watt, ±5 %, unless marked otherwise. Resistor values are in ohms (k = 1,000 ohms).
2. All capacitor values are in microfarads (p = picofarads).
3. ⚠ Parts marked with this sign are safety critical components. They must alway be replaced with identical components – refer to the TEAC parts list and ensure exact replacement.
4. ☐ : front panel indication
5. ⬚ : rear panel indication
6. DC voltages are reference values.
   DC voltage measurement conditions
   - Measure with DC volt meter
   - Mode REC/PAUSE

TASCAM
TEAC Production Products

133-B
MULTI-IMAGE STEREO PLUS CUE
CASSETT